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THE PENNSYLVANIA DAIRYMEN'S ASSOCIATION

Organized 1925

SUCCEEDING THE FOLLOWING ORGANIZATIONS:

The Crawford County Dairy Association (1871)
The Pennsylvania Dairy Association (1874)
The Pennsylvania Dairy Union (1898)
The Pennsylvania Livestock Breeders' & Dairymen's Assn. (1916)

REPORT OF SECOND ANNUAL MEETING

Held in Felton's Hall
HARRISBURG, PENNA.

January 19, 1927

A. A. BORLAND, *President*, State College, Pa.
ROBERT F. BRINTON, *Secretary-Treasurer*, West Chester, Pa.

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THE DAIRY INDUSTRY IN PENNSYLVANIA

A. A. Borland, *President*
The Pennsylvania Dairymen's Association

The Pennsylvania Dairymen's Association has been active during the past year and I believe it will fulfill its mission in striving to advance the interests of the dairy industry in the state.

Dairying is one of the most important agricultural enterprises in the United States. In 1925 there was produced in this country 116,505,395,000 pounds of milk with a farm value of $2,747,000,000. This exceeds the combined value of the cotton, wheat, and potato crops in the United States. If we compare the value of the dairy products with that of the mineral wealth of the United States we find that the annual farm value of the dairy products in this country exceeds by over $500,000,000 the combined value of all the gold, the silver, coal, iron, copper, lead, zinc, granite, marble, clay products, limestone, phosphate rock, and slate produced in the United States.

Pennsylvania is also a great dairy State. According to the 1920 census dairy cows were kept on 89.3 of all the farms of the state. Beef cattle were kept on only 23.2%, swine on 73.2, sheep on only 9.4% of the farms of the state. It is, therefore, evident that dairying is the most widespread and most important livestock enterprise in Pennsylvania.

The following table gives the number and value of the different classes of livestock in the state at the last census:—

NUMBER AND VALUE OF LIVESTOCK IN PENNSYLVANIA
1920 CENSUS

	Number	Value
Dairy Cattle	1,315,803	$106,676,549
Horses	505,966	60,828,872
Beef Cattle	229,745	16,389,069
Swine	1,190,951	22,111,277
Sheep	508,711	5,192,704
Poultry	15,226,961	18,639,535

It is evident from the above table that the value of dairy cattle exceeds the combined value of all the horses, beef cattle, swine, and sheep, in Pennsylvania.

Pennsylvania also ranks high in dairying in comparison with other states. The following table shows the rank of Pennsylvania in various phases of the dairy industry as compared with other states:—

RANK OF PENNSYLVANIA IN DAIRYING

	Year	Number	Rank among states 1920
Cows (2 yr. old, over)	1920	885,855	7th
Purebred dairy cattle	1920	153,037	3rd
Milk, gallons	1920	421,631,355	4th
Farm value dairy products	1920	$99,617,373	3rd
Condensed milk, pounds	1920	184,951,684	3rd
Farm cheese, pounds	1920	532,238	2nd
Factory cheese, pounds	1920	15,438,708	3rd
Farm butter, pounds	1920	38,468,607	2nd
Milk consumed, gallons	1920	436,000,850 (est)	2nd
Ice cream, gallons	1925	36,746,000	1st
Ice cream, gallons (New York)	1925	24,231,000	2nd

It will be noted that Pennsylvania stands seventh for number of cows, third for purebred cattle, fourth for milk production, third for the farm value of its dairy products, third for condensed milk, second for farm cheese, third for factory cheese, second for farm butter, second as a milk consuming state, and is the first state in the Union for the production of ice cream, outranking its nearest competitor, New York state, by over 12½ million gallons in 1925.

Not only is dairying the most outstanding livestock enterprise in Pennsylvania, but it also ranks high in comparison with other agricultural enterprises in the state. The following table from the Bureau of Statistics, Department of Agriculture, Harrisburg, Pennsylvania in the report of 1925 sets forth the data for the agricultural industry as a whole in the state. This data is given in Bulletin 423.

DAIRYING AND OTHER AGRICULTURAL ENTERPRISES IN PENNSYLVANIA

Crop—1925	Value—1925	Total Value
Farm Value of Milk		$97,815,069.80
Hay	$73,017,974.70	
Rye	2,017,054.92	
Oats	20,473,958.67	
Barley	416,240.00	
Total		$95,925,228.29
Wheat	$33,398,399.59	
Corn	57,976,765.78	
Buckwheat	4,416,230.08	
Total		$95,791,395.45
White potatoes	$43,394,345.90	
Sweets and yams	483,000.00	
Clover seed	455,300.00	
Apples	10,176,136.00	
Peaches	1,439,989.00	
Pears	725,397.00	
Grapes	1,062,100.00	
Honey	612,605 28	
Maple sugar	52,000.00	
Maple syrup	382,000.00	
Wool	1,415,648.77	
Eggs	29,194,098.90	
Total		$95,392,620.85

It will be noted that the farm value of the milk produced in Pennsylvania in 1925 exceeded by almost two millions the combined value of the hay, rye, oats, and barley crops. It exceeded by over two million dollars the combined vaue of the wheat, corn, and buckwheat crops. It exceeded by nearly two and one-half million dollars the combined value of the potatoes, sweets, clover seed, apples, peaches, pears, grapes, honey, maple products, wool, and eggs. It is plainly evident that dairying is the most substantial enterprise in the agriculture of the state.

Someone has said, "Prosperity follows the dairy cow." This is apparently true of individuals, states, and nations. Usually the most prosperous farmers in a community are those engaged in the dairy business. The most prosperous states in the Union will be found to be those in which the dairy enterprise is well developed. One has only to compare Holland, a great dairy country, with Russia in which there is little dairying or compare Denmark, in which dairying is the predominant enterprise, with Spain in which little dairying is done to note the relative prosperity of nations in which dairying is a prominent enterprise.

There is a good reason why dairy farms are usually fertile farms as the following table will show.

FERTILITY VALUE—ONE TON AT 20c PER LB. FOR NITROGEN, 5c FOR POTASH AND 5c FOR PHOSPHORIC

Timothy Hay	$ 5.63
Clover	10.21
Wheat Straw	2.87
Corn	6.94
Oats	9.29
Wheat	8.85
Bran	14.81
Cottonseed Meal	32.72
Linseed Meal	24.65
Milk	2.60
Butter	.64

It will be noted from the table that if a farmer sells from his farm a ton of timothy hay, it represents $5.63 worth of actual commercial fertilizer values. A ton of clover hay contains $10.21 worth of fertilizer. A dairy farmer usually feeds these products on his farm and buys some high protein concentrates such as cottonseed meal, every ton of which brings on to his farm $32.72 worth of fertilizer. After he has fed this cottonseed meal to his dairy cows and received its feed value in the form of milk, there is

left over 80% of its original value for fertilizer in the form of manure to increase the fertility of the farm. This means a ton of cottonseed meal gives the farmer over $25 worth of fertilizer after it has been fed through the dairy cow. A ton of linseed meal brings on to the farm $24.65 worth of fertilizer and after it has been fed through the dairy cow there remains at least $19.00 worth of its original fertilizer value in the manure. On the other hand, the dairy farmer sells milk from his farm, a ton of which contains only $2.60 worth of fertilizer, while a whole ton of butter would remove from the farm only 64c worth of fertilizer. This is the reason why dairying makes a fertile farm. If a dairy farmer makes a good use of the barn yard manure, supplements it with acid phosphate and applies some lime occasionally to keep the soil sweet he will have a system of fertilization which will insure good crops.

Dairying is also the industry most closely related to human welfare. Recent experiments have shown that milk and other dairy products are rich in the vitamins which are so essential to growth in the young and are also very helpful in the nutrition of adults. Experiments with small animals show that if one animal is fed a balanced ration, the fat portion of which is derived from butterfat while another animal is fed a balanced ration, the fat portion of which is derived from vegetable fats and oils, the animal receiving the butterfat will thrive excellently while the other will give evidence of insufficient nourishment, will be stunted in growth, and will likely develop xerothalmia, a disease which results in sore and inflamed eyes. Butterfat contains the growth-promoting vitamin known as fat soluble A. Vegetable fats and oils, do not contain this vitamin, hence oleo-margerine and other butter substitutes are greatly inferior to butter in their actual nutritive value. Milk also contains vitamin B which prevents a paralysis known as beri-beri in the human race. It contains vitamin C which prevents scurvy, vitamin D which prevents rickets, and vitamin E which is associated with reproductive activities. There are about two and one-half million babies in the United States under one year of age and it has been estimated that two-thirds of these must depend on cow's milk for their food, either wholly or in part, before they are one year of age. It is, therefore, evident that the cow is indeed, "The foster mother of the human race" as she has so aptly been called.

Again the dairy cow is essential to the economic welfare of the state and nation inasmuch as she is the most economic producer of human food among farm animals.

The following table illustrates this fact:—

THE COW AS AN ECONOMICAL PRODUCER OF FOOD

	Edible Solids from 100 lbs. Digestible Dry Matter
Cow, milk	18
Pig, dressed	15.6
Calf	8.1
Poultry, eggs	5.1
Poultry, dressed	4.2
Lamb, dressed	3.2
Steer, dressed	2.8

If, from the foregoing table, one compares the food produced by a cow in her milk with that produced by the steer in his carcass, it is evident that a cow from a given amount of feed produces over six times as much human food in her milk as does a beef steer in his carcass. This does not mean that there is no place for swine, poultry, lamb, and steers in our agriculture program. It should be said that there is a proper place for all of these different forms of livestock, yet it does mean that the place of the dairy cow is secure in the economic welfare of the nation, because she is the most economical producer of human food among all the different classes of livestock.

While dairying is not a get-rich-quick scheme, yet it does have the advantage that it is safe and is free from the extreme fluctuations of market prices which are likely to take place in some other agricultural products. It was noticeable during the period of war that the prices of dairy products did not soar to the heights reached by most other agricultural products, yet when the slump came in prices at the close of the war, dairy products did not fall to the low price level which were reached by other agricultural products.

Dairying is adapted to intensive methods and high-priced land values. In the islands of Jersey and Guernsey land rents are $250 per acre per year. People are in the dairy business on this land and making a good living. In the country of Holland land sells for $2000 an acre. People are also engaged in dairy business on this land and making a fair living at it. In our own country there are those who are engaged in the dairy business right outside the city limits of various towns where land is high in price and are prospering in the dairy business.

General agriculture is not so well adapted to intensive methods. If one is growing grain crops or is engaged in some other livestock enterprises which require large grazing areas it is difficult to secure sufficient returns to make these enterprises profitable on extremely high-priced land.

Pennsylvania is one of the best dairy market states in the union as the following table will show:

MARKETS IN PENNSYLVANIA—1920 CENSUS

Cities 2500 population	Pa. 314; Ill. 171; N. Y. and Mass. 169.
Cities 2500-5000 population	Pa. 144; N. Y. 81; Ill. 80; Tex. 60.
Cities 5000-10,000 population	Pa. 93; Mass, and Ill. 47; Ohio 44.
Cities 10,000-25,000 population	Pa. 57; Mass. 39; N. Y. 36; Ohio 29.
Cities over 25,000	Mass. 27; N. Y. 22; N. J. and O. 21; Pa. 20.

It is evident that Pennsylvania has almost twice as many cities of 2,500 population as the nearest competing state. This is also true of the comparison between Pennsylvania and other states for larger cities. Until we get to the cities having a population of over 25,000 Pennsylvania outranks by far any other state in the Union in number of cities. When it comes to cities of large population, Pennsylvania falls from first place, yet it is not so far behind other states in this respect. As a whole, it must be said that the state has best market facilities in the Union. There are so many moderate-sized cities that each farmer practically has a good market near his own door.

The state is unusually fortunate from a dairy standpoint in having three large milk marketing organizations which care for the farmers' interests in this respect. The Inter-State Milk Producers' Association in the eastern part of the state with headquarters at Philadelphia, the Dairymen's League in the northern part of the state, with headquarters at New York City and the Dairymen's Cooperative Sales Company in the western part of the state with headquarters at Pittsburgh are doing a splendid work in marketing the milk and cream produced by their respective members.

It is encouraging to note an increasing consumption of dairy products. The following table tells the story:—

CONSUMPTION PER CAPITA U. S.

	1922	1923	1924	1925
Milk (gal.)	.50	53	54¾	54¾
Butter (lbs.)	16½	17	17½	17.04
Cheese (lbs.)	3.74	3.91	3.73	3.83
Condensed and Evap. Milk (lbs.)	12.69	13.25	15.2	14.87
Ice Cream (gal.)	2.43	2.66	2.55	2.83

There is a gradual increase in the consumption of dairy products per capita. In no small measure the credit for this is due the efficient work of the Philadelphia Inter-State Dairy Council and the Pittsburgh District Dairy Council both of which have been active in bringing to the attention of the urban population the high food value of milk and milk products. The Dairy Councils have also been active in improving the quality of dairy products, which in turn has resulted in a stronger demand for them.

Rapid strides are being made in the general improvement of the dairy industry in Pennsylvania. The cow testing association has proven one of the most potent agencies for greater efficiency in the production of milk. Through these associations records are kept of the milk and butterfat production, the feed consumed, and the net returns and cost of milk and butterfat production for each individual cow in the herd. In this way, low producers are discovered and eliminated from the herds. The heifers from the best cows are reared, which practice makes for higher production and lower cost per hundred pounds of milk produced. In 1926 there were fifty of these organizations in active operation in the state of Pennsylvania. The associations included 1175 members having a total of 18,200 dairy cows. It is to be hoped that these associations will continue to multiply so that their services will be utilized by practically all the dairymen in the state.

Cooperative bull associations are also proving an important agency in the improvement of dairy herds in the state. By this means a number of dairymen may cooperate in the purchase of a better sire than any one of them could afford to own by himself. Usually three or four groups of dairymen form the association and the sires are moved from group to group every two years so that in an association of four groups, each dairyman gets the use of an excellent sire for eight years for the one initial investment. This has been found to work most advantageously and is adaptable both to the dairymen having only a few cows and to those having larger herds. The records of the different associations show a marked improvement in the daughters of these good sires as compared with the dams. Pennsylvania is the first state in the Union for bull associations. In 1926 there were forty-seven such associations with 624 members owning cooperatively 172 herd sires.

It must be stated that the county agricultural agents located in the different counties throughout the state have largely been the animus for the establishing and maintaining of these important cooperative dairy enterprises. The men in charge of the cow testing associations in the state have also been leaders in their respective communities for the improvement of dairying in the locality. Usually however, some of the local dairy leaders in each community have been responsible for the direct establishment of the associations.

Through these various activities a better quality of dairy products is being produced in Pennsylvania than ever before.

The result in more efficient production is also very noticeable. In 1920 the average cow in Pennsylvania was producing 464 gallons of milk. In 1925 the average production per cow had been increased to 511 gallons. This is a noteworthy improvement. There were 14,944 fewer cows in the state than in 1920, yet the production of milk for the state had been increased 24,641,926 gallons. More milk from fewer cows is one of the first essentials in a more profitable dairy business.

The program of the Pennsylvania Dairymen's Association for this meeting should be helpful in bringing to its members the latest information in dairying. The association this evening will award ribbons to 377 dairymen whose herds include over five cows and have averaged above 300 pounds of butterfat per cow for the past year. This is a decided increase over the number of similar herds last year. The market milk exhibit this year is the largest in the history of the State Farm Products Show with 146 entries in the different classes. This is an encouraging situation. I understand that the scores are unusually high. The butter exhibits are also unusually high quality. The cattle exhibits by the various breed associations of the state are most commendable. It is to be hoped that by another year more adequate space may be provided for such exhibits at the State Farm Products Show.

We feel that the dairymen of the state are to be congratulated for the splendid showing that they have made at the Farm Products Show, for the improvement they are making both in their herds and in the quality of the dairy products they are producing, and for the active interest they are taking in their own Pennsylvania Dairymen's Association. We trust that the Association may be of continually increasing value to its members.

PROGRAM OF THE DAY'S SESSION

The Pennsylvania Dairymen's Association

Harrisburg, Pa., January 19th, 1927

MORNING SESSION

"What Research Work is State College Doing for the Dairy Farmer of the State?"

DR. S. I. BECHDEL

Professor of Dairy Production Research, State College, Pennsylvania

"The Oven Method of Curing Hay"

H. W. JEFFERS

President of Walker-Gordon Farms, Plainsboro, New Jersey

"The Control of Contagious Abortion and Some Statistics on Bovine Tuberculosis"

DR. F. A. MARSHALL

Bureau of Animal Industry, Harrisburg, Pa.

"The Herd Test Plan"

C. T. CONKLIN

Secretary, Ayrshire Breeder's Association

AFTERNOON SESSION

"Mineral Nutrients for Dairy Cows"

DR. E. B. FORBES

Director of Institute of Animal Nutrition, State College, Pennsylvania

"Economic Facts for the Man Who Milks Cows"

E. M. HARMON

Associate Editor, *The Dairy Farmer*, Des Moines, Iowa

"Some Results of Investigations at the United States Dairy Bureau Farm, Beltsville, Maryland"

T. E. WOODWARD

Superintendent, U. S. Dairy Bureau Farm, Beltsville, Md.

"High vs. Low Protein for Dairy Cows"

Round Table Discussion

EVENING SESSION

DAIRY BANQUET, MASONIC TEMPLE

(See page 58 for details)

BUSINESS SESSION

The general business session of the Pennsylvania Dairymen's Association was held in Felton's Hall, at 1.30 P. M. Reports of the Secretary-Treasurer were received. The treasurer's report showed a cash balance of $110.20.

A committee on nomination, consisting of Miles Horst, H. D. Allebach and R. R. Welch, presented the following list of officers for nomination to serve for the coming year. President, E. B. Fitts, State College, Pa.; First Vice President, Dr. L. M. Thompson, Montrose, Pa.; Second Vice President, M. T. Phillips, Pomeroy, Pa.; Third Vice President, W. F. Shrum, Jeannette, Pa.; Secretary-Treasurer, R. F. Brinton, West Chester, Pa. No further nominations were made from the floor and these nominees were by motion declared elected, to serve during the coming year.

A resolutions committee, composed of Allen D. Miller, R. W. Balderston and W. S. Wise, presented the following resolutions, which after discussion were approved.

1. The Pennsylvania Dairymen's Association, in annual meeting assembled, hereby endorses the action of the State Department of Agriculture in condemning the manufacture and sale of so-called "Viscolized Milk." We urge that the State Government take all necessary steps to break up the practice as being a fraud upon the consuming public.

2. The Pennsylvania Dairymen's Association expresses its approval of the work of the State Department of Agriculture in its endeavor to aid the dairymen of the state in conquering the scourge of contagious abortion. It is urged that this work be continued.

3. During the past few years, there has been a pronounced national trend toward the requirement of the tuberculin test by City Boards of Health for all dairy herds shipping to such cities, as shown by the annual report of the Secretary of Agriculture of the United States for 1926. There is at present a widespread demand on the part of Pennsylvania dairymen to have their herds tested so as to be prepared to meet such requirements. We urge that the Pennsylvania

State Legislature make adequate appropriation necessary to care for the estimated needs for each indemnification for the next two years as has been outlined by the State Department of Agriculture.

4. The Pennsylvania Dairymen's Association urges the State Legislature by appropriation to provide for the growing needs of State College, including adequate maintenance of the Department of Dairy Husbandry and a much needed new building for the teaching of Dairying and training in the processing and manufacturing of Dairy products.

5. Resolved, that the Executive Committee of this Association be empowered to arrange that this Association be represented in any efforts that may be made to secure greater uniformity throughout the State and between neighboring states in the matter of sanitary requirements for the production and distribution of milk and cream.

6. The Pennsylvania Dairymen's Association urges the State of Pennsylvania to cooperate in providing adequate facilities through buildings and equipment for the housing of the Pennsylvania Farm Products Show, now the largest exposition of its kind in the United States.

Appointment of committees, announced by the President, were as follows:

Committee to represent the association in the Pennsylvania State Council of Agricultural Associations, R. F. Brinton, West Chester, Pa.; Allen D. Miller, Susquehanna, Pa., and E. B. Fitts, State College, Pa.

Committee on Farm Products Show, E. B. Fitts, State College, Pa.; R. F. Brinton, West Chester, Pa., and W. S. Wise, Pittsburgh, Pa.

There being no other business before the meeting the business session adjourned.

RESEARCH WORK AT STATE COLLEGE

DR. S. I. BECHDEL, *Professor of Dairy Production Research*, State College, Pennsylvania

What Research Work is State College doing for the Dairy Farmer of the State? "The Grinding of Roughage for Dairy Cows; Soy Bean Hay for Milk Production; Vitamine Experiments with Dairy Cattle; Raising Calves on Skimmilk Powder; Corn-Soybean Silage; Best Stage of Maturity of Corn for Silage; Sunflower Silage; Red Clover Silage; Molasses for Dairy Cows, etc."

It is the aim in the dairy production research program at State College to have under way two more or less distinct types of experimental projects, viz, (1) investigational projects usually of short time duration that are intended to give results of more or less immediate practical value, and (2) research projects of scientific nature that may not be of immediate practical value. A certain amount of the former kind of projects are necessary and desirable, but the latter amount to most in the long run. It is a project of fundamental research nature that is going to advance dairying as a science and prove ultimately to be the most economical.

The most outstanding short time investigational projects that have received our attention in the past few years are listed as follows:—

1. Feeding investigations with silage made from various crops such as mixed corn and soy bean forage, sunflowers, sunflowers and corn mixed, oats, and Canada field peas, and clover.

2. Studies on the quality of silage for milk production as affected by stage of maturity of corn.

3. Soybean hay for milk production.

4. Whole buckwheat as a substitute for corn in the ration.

5. Comparative feeding values of buckwheat middlings and gluten feed in a ration for milk production.

6. Raising calves on a dry ration with skimmilk powder supplement.

The projects of fundamental research nature that have received our attention are as follows:—

7. What effect does molasses have on the digestibility of the total dairy ration?

8. Ground vs. unground alfalfa hay.

9. Deposition of minerals in the bones of dairy calves.

10. Relation of dairy type to milk production.

11. The vitamin requirements of calves for vitamins A and B.

12. Is the vitamin B content of milk dependent on the presence of this dietary factor in the ration?

13. Is vitamin B synthesized in the rumen of the dairy cow?

With no attempt to give detailed information on any of the above projects, I shall endeavor to point out a few of the most interesting and worthwhile results. In our silage feeding investigations for milk production, mixed corn and soybean forage did not prove much superior to straight corn as a silage crop. The results would not justify recommending the practice.

Sunflower silage, stored alone or with corn, was much inferior to corn silage for milk production. It is concluded that this crop cannot be recommended for Pennsylvania farms except in a few altitude sections where corn is not a sure crop.

Canada field peas and oats are recommended as a silage for summer feeding. Such silage does not have the milk producing ability of corn silage, but it is far better than no silage at all where poor, medium, or no pasture at all is available.

The stage of maturity of corn was found to play a very appreciable part in the quality of silage for milk production. The nutritive value was found to advance up to maturity. Pennsylvania dairy farmers are advised to grow a variety of silage corn that will attain in average years at least the milk stage or more of growth before it is necessary to ensile it because of killing frosts.

Soybean hay and alfalfa hay of good quality were found of equal value for milk and butterfat production. Soybeans are recommended as a splendid emergency crop that may be used in the absence of either clover or alfalfa. The crop may be easily seeded and grown on short notice when poor prospects for clover or alfalfa are definitely known.

Ground buckwheat was found to take the place of corn meal in the dairy ration without seriously affecting milk production.

Buckwheat middlings and gluten feed were found of equal feeding value for milk production.

Nine digestion trials conducted on four Holstein cows in milk over a period of 63 days gave conclusive evidence that molasses plays an almost insignificant role in the digestibility of a dairy ration. With the exception of the energy, the value of molasses in the dairy ration is, therefore, due entirely to its effect on palatability.

In order to study the effect of grinding of roughage on digestibility of the total ration, nine digestion trials were conducted on two Jersey cows in milk. In one case ground alfalfa hay was fed with grain. In another, hay from the same lot was fed unground and separately from the grain. It was found that the grinding treatment of the hay tended to improve the digestibility of the ration about two per cent. As to whether this improvement is sufficient to justify the trouble and expense of grinding the hay is an open question. Further studies are planned before definite recommendations will be made.

On account of the mineral situation coming to play such an important role in the nutrition of dairy animals, a study was started last year to get some definite information on the deposition of minerals in the bones of dairy calves. The plan calls for slaughtering them at different ages from birth to 180 days. Seven calves have been studied to date. Calcium and phosphorus determinations are made in the ribs, femurs and humeri. The data obtained with some additions are intended to serve as a basis of further studies in which rachitic and other deficient rations will be employed.

Proprietary and home-mixed calf meals have not proven entirely satisfactory and are far less popular than they were several years ago. Skimmilk powder is fast coming into favor for calf raising and many questions concerning its use are coming up. We have recently started an experiment to determine the advisability of feeding skimmilk powder in the dry form to take the place of liquid skimmilk. At the time the calves are a month old they are given a dry ration containing skimmilk powder. The feasibility of this feeding practice, as well as the optimum amount of the powder to feed, along with a grain ration, is an object of the study. The advantages of a dry ration as compared with a liquid one are apparent. The results to date are very encouraging. Data on more than 40 calves will be obtained this year.

For over two years we have had under way an experiment designed to determine the relation of dairy type to milk production. Forty-three items of ante-mortem data, including various body measurements, weights, photographs, milk production records, etc. and 61 measurements of the carcass, viscera, ductless glands, blood, and all of the principal internal organs, are taken

on cows slaughtered in the college herd after they have served their period of usefulness. Data has been secured to date on more than thirty individuals. This college, as well as about 15 others is sending the data to the Federal Bureau of Dairying at Washington. When a sufficient amount of data is so collected (several hundred cows) the Bureau will make a comprehensive study through mathematical correlations of the various weights, measurements, and milk production records. This is the first real attempt to determine whether or not the ideal type as taught by the college and used by cattle judges is scientifically correct.

Studies on the vitamin requirement of cattle have been in progress for over three years. Fourteen heifers have been grown normally to maturity, conceived, and at this writing ten of them have dropped strong healthy calves on a ration deficient in vitamin B. The evidence has proven conclusively that calves do not have a requirement for vitamin B in the ration. If it is assumed that calves possess a physiological requirement for vitamin B like that found in rats and several other animals, the behavior of these experimental calves can be explained only on the basis of vitamin B synthesis by bacteria and other micro-organisms in the digestive tract, unless future investigations should prove that various species of animals differ materially in their vitamin B requirement.

The ration, which was made up of dried sugar beet pulp and a concentrate mixture, (no hay was fed) proved inadequate for lactation. The heifers went off feed very suddenly in from one to three weeks after freshening, became very weak and emaciated, and different tests were made to establish the fact that the trouble was not due to vitamin B deficiency. It is not likely either that it was due to an unknown dietary factor. Rather conclusive evidence was presented by one heifer to indicate that the trouble was due to the mere lack of bulk in the ration. In her case, about three pounds of poor quality, over-ripe timothy hay was supplement with her ration at the time she freshened. This treatment caused the function of rumination to start up, something that had been lacking in all of the animals that had been fed the experimental ration. (Some of them for nearly three years.) This heifer continued on the ration for several months in lactation with no signs of coming down like all of the others had done. Further studies will be made to determine the importance of bulk in the ration of lactating animals.

A study of the milk from some of the experimental heifers was made through rat feeding trials to determine whether vitamin B was present in the milk that was produced on a ration deficient in vitamin B. The results showed conclusively that the factor was present in about the usual amounts found in normal herd milk

in winter. This result offered some evidence that vitamin B must be synthesized somewhere in the animal body.

A study of the synthesis of vitamin B in the animal body is in progress at the present time. By means of a surgical operation, a permanent opening has been made through the left side into the rumen of one of the experimental heifers. This opening which is kept closed by a special pocket or door, affords a means of removing portions of fermented and partially digested feed from the rumen for study. By extracting this feed with alcohol, and feeding the dried extract to rats, it will be possible to determine whether vitamin B has been produced by the bacterial fermentations that occur within the rumen. Positive evidence will completely explain and further substantiate the consistent results already obtained on growth, reproduction, and milk studies.

After the vitamin studies are completed, it is the plan to use the experimental heifer with the stomach opening in her side for digestion studies on the grinding of hays and other roughages. This heifer will afford means of making direct observations on the rumen content at any time.

In submitting this brief summary of our dairy production work completed and in progress, I am prompted to close with a statement concerning other important lines of investigations that are demanding our attention. Long time mineral feeding experiments should be initiated in cooperation with our Institute of Animal Nutrition. Our plan would be that such an experiment should employ at least forty animals, starting them at less than 1 year of age with the idea of studying them over a period of several years covering growth, gestation, and lactation. Both leguminous and gramineous roughage would be used on various groups with and without mineral supplements.

Experiments on fertilization of pastures should be started in cooperation with the Department of Agronomy. The scheme would be to test out the carrying capacity of pasture plots treated with different fertilizer applications by pasturing dairy animals on them.

It is very urgent that these two important lines of investigations and several others of lesser importance be included in our program. Such is not possible, however, until federal or state funds are provided.

THE OVEN METHOD OF CURING HAY, AND OTHER METHODS EMPLOYED AT THE WALKER-GORDON FARMS

H. W. JEFFERS, *President of the Walker-Gordon Farms,*
Plainsboro, N. J.

The problems of a large dairy, so far as organization here is concerned, are different from the small dairy and the size of a dairy determines the plan of organization that must be created in order to make it economic. The large dairy is still pioneering to find the most economic type of organization. If it is to find its economic place in the industry it must be able to work out labor saving devices so one man can do more work than under the old system. The working out of these problems are somewhat similar to the experiences that manufacturing industry has had to go through.

The experiments, which the Walker-Gordon Laboratory Co. are conducting in the commercial drying of forage crops by the use of the Mason System, is only one of the many problems that its Commercial Research Department is working on. We have the dryer erected having a capacity of two tons of dried material per hour. The forage is harvested in the field by a machine that cuts and loads it on a dump truck; the dump truck, when filled, is run to the drying machine and dumped on to a receiving platform; it is then conveyed to a mattressing machine, making a mattress nine inches wide and from eight to twelve inches thick depending upon the material being dried. It then goes through a kiln one hundred eighty feet long on a slow moving conveyor where it is subjected to hot air which is produced by burning coal and then forced into the kiln by a large oven. The moisture is reduced to less than 12% under this continuous process, the product being conveyed into a hammer mill where it is ultimately turned into meal and blown into storage. Seven men will take care of the harvesting and drying of this product, also the storage. It comes from the machine without loss of color. Experiments are being conducted by feeding small animals the product in comparison with the choice Colorado Alfalfa. These animals are showing a better growth on the artificially dried product illustrating that vitamins must be retained by this system that are

lost by sun drying. The little experimentation that was done last fall indicated that forage crops cut young have a much better protein content than when permitted to mature. A comprehensive study of all kinds of forage crops, that can be grown in our section, including alfalfa, will be made this coming season under the direction and supervision of the State and U. S. Department of Agriculture.

You have asked me to say something about the control of flies. We had a plan last season of controlling flies at our dairy plant which proved effective and not very expensive. Beginning June 1st we placed a number of home-made fly traps outside, preferably in protected places, baited with molasses, bran or milk. These traps were taken up twice a week, flies killed and traps returned with fresh bait; we also clean up any decaying vegetation to prevent breeding of flies. From July 1st to October 15th we fog our barns with "Flit", a preparation manufactured by the Standard Oil Co. This work was done at night by the use of an electrically driven paint machine and finishing nozzle. A barn 40 ft. x 50 ft. could be fogged in about fifteen minutes. This was done twice a week and was sufficient to exterminate the flies to a minimum. The cost of the material for this work was about 50c per animal and the labor of equal cost making a total of $1.00 per animal for the season. This cost is saved many times over by the additional amount of milk the animal will give when free of flies.

The question of buying or raising cows is often discussed. The large dairies near our great centers of population, as a rule, depend upon buying their cows, and raise very few. Last spring the Bureau of Animal Industry and the College of New Jersey, in cooperation with the Walker-Gordon Co., worked out a plan whereby it would be economical to raise calves at these dairies up to the age of five or six months, or when they no longer required milk, then send them out to districts less favorably located for milk production where they could be grown on a pound gain basis. This plan is being experimented with at the present time and indications are that the system will be developed that will not only be good business for the party growing the heifers on a pound gain basis, but will give the dairyman an animal free of disease and a better producer than he could buy. Under this plan, by the use of proven sires and good dams, the dairyman can look forward to increasing the productivity of his herd. Of the eleven cows that stood the highest in production among 1200 at the Plainsboro Plant in 1926, eight were bred and grown at the farm. This plan when once put into operation will make it possible to utilize large areas, which are now unproductive

in the hilly sections of Northern Pennsylvania, North Jersey, Southern New York and New England.

I have only briefly touched upon these various subjects, any one of which fully discussed would occupy all the time alloted to me.

I hope if any of you are in the vicinity of Plainsboro, New Jersey, you will call upon us and see for yourself this experimental work which is being conducted.

Do Farmers Cooperate?

Yes—if They Have a Sound Cooperative Enterprise

That "if" is the important word. "If," as interpreted by the Eastern States Farmers' Exchange, means: provided there is a real need for cooperation, provided the cooperative is managed solely for the interests of all the cooperating members, large and small alike, and provided the members are kept informed not only about the spectacular accomplishments but also about the problems and difficulties their organization faces.

The reports of the officers at the annual meeting in Springfield, Mass., February 23, 1927, mark the close of the Eastern States Farmers' Exchange business for 1926. Again substantial progress was made. Business in the older territories increased, new territories were added, the cost of operation per ton of commodities distributed was further reduced, nearly 2000 names were added to the list of patrons.

Eastern States service has grown to its present volume because farmers at 670 stations have learned from experience that this service offers them something worth developing. Every farm now being served through this great buying cooperative was previously supplied through some other source. Those farmers who have never given this service a trial must realize that their fellow farmers would not have swelled the volume of tonnage to 131,980 tons in 9 short years in Eastern States existence had they not found that the Eastern States commodities and service were more valuable. Farmers who thoughtlessly repeat the slogan "Farmers can't get together" should qualify that statement for the Eastern States Farmers' Exchange has proved conclusively to easterners that farmers are just as quick to get together and stick together when a sound proposition is presented to them as any other class of intelligent citizens.

For information on Eastern States Feed Service, a cooperative service which should not be confused with the car-door service offered by private manufacturers through dealers or groups of farmers, write the office.

Eastern States Farmers' Exchange

A non-stock, non-profit organization, owned and controlled by the farmers it serves

SPRINGFIELD MASSACHUSETTS

THE CONTROL OF CONTAGEOUS ABORTION AND SOME STATISTICS ON BOVINE TUBERCULOSIS

Dr. F. A. Marshall, *Bureau of Animal Industry,*
Harrisburg, Pa.

1.

What Is Abortion?

Variously termed; Contagious Abortion, Infectious Abortion and better known as Abortion Disease. It is a specific infectious disease and is transmitted from one animal to another.

A cow infected may abort or she may attain her full period of gestation but will be a source of infection for the other cows in the herd.

It is the premature expulsion of the fetus from the uterus and may occur at almost any stage of gestation. It may occur so early that it is only by chance discovered or so late that the full period of gestation has been attained.

2

What Is the Cause?

It is very often blamed on a kick, hook, fall or from feeding. This is usually a mistake and is nearly always caused by Bacillus Abortis Bang.

3

How Much Damage Is Caused by Abortion?

There are more losses caused by this than any other disease known. Pennsylvania has a five million dollar loss per year, it is estimated.

Many dairymen and breeders have failed financially on account of this disease in their herds and many valuable lines of breeding have been lost from Bovine Infectious Abortion.

4

What Happens When a Cow Aborts?

The value of the calf is lost. Other cows become infected. The milk supply is impaired. The cow's reproducing organs undergo an abnormal physiological change, which will, no doubt, leave her temporarily or permanently sterile. Her udder undergoes abnormal physiological changes leaving one or more quarters blank, in other words, the breeder has one more cow as a boarder

instead of a profitable investment. This cow might have possibly made a state or world's record. The Cow Testing Association has lost an enthusiastic breeder of good cows.

5

What Are the Symptoms of Abortion?

The symptoms of approaching Abortion are as those preceding normal calving. Two or three days preceding Abortion there will be a swelling of the udder, swelling of the external genital organs and appearing of a mucoid ordorless discharge from the genitals will be noticed.

6

How Can Infectious Abortion Be Recognized in the Herd?

By the visible offspring in the herd or the breeding records if they are full time calves. By the blood testing of every animal in the herd, regardless of age. This is done by the local veterinarian in conjunction with the Penna. B. A. I. Laboratory. From four to six drams of blood is drawn from the jugular vein in a clean and sterlie test tube and mailed to the Laboratory. After giving it the proper test it will show either positive or negative. Positive meaning infected. Negative, not infected.

7

What Are the Treatments?

Science has failed to discover a cure of any value. The glowing and rosy literature and smooth talk of a real salesman has cost the dairymen and breeders thousands of dollars to find out the cures are only fakes. However, practically all veterinarians and breeders with experience regard them as worthless.

8

Is This a New Disease?

The records show that it was reported from England in 1567, as 60% of their herds aborted.

Professor Bang, of Denmark, discovered a specific Bacillus Abortis Bang in 1896. Pennsylvania has studied and investigated the disease since 1911, and during this time a definite plan has been put into operation for the control of Abortion and there are 400 herds now working under this plan. One hundred and forty-eight breeders have signed the agreement to cooperate with the Pennsylvania B. A. I., to eradicate the disease. When a breeder signs this plan and continues for one year with no abortions in the herd he will receive a certificate of health, and free from Abortion. Twenty-four have received their Certificates,

some of which are renewals of several years. Many of the Breeder Associations have recognized Bovine Infectious Abortion and have adopted regulations in their By-Laws to prevent the sale of infected animals to a fellow breeder only after he has been properly informed.

September 10, 1926, the Secretary of Agriculture issued a Proclamation:—

"Under authority of the Acts of Assembly, approved July 22, 1913, and June 7, 1923, it is adjudged and proclaimed that the disease of cattle variously known as Contagious Abortion, Abortion Disease; Bang's Disease or Bovine Infectious Abortion is of a transmissable character, and that; Cattle affected with or exposed to or suspected of being carriers of said disease, shall be subjected to Quarantine and The Rules and Regulations that shall be adopted by the Pennsylvania Department of Agriculture for the prevention, control and suppression of Bovine Infectious Abortion."

9

What Herds Can Follow This Plan of Testing?

It makes no difference as to the size of the herd the owner cannot afford to disregard the blood test. There is one thing sure, aborting herds cannot be made profitable as has been proven.

It has been proven the Bactirum of Bang is taken in through the feed and water to the digestive tract, then to be floated around in the juices of the body, being carried to the interspace of the uterus and the fetal membrane and there to propagate and cause Abortion, or a normal time calf may be dropped with the infection intact. The fetal membrane, the fetal fluid, and the calf and the infected cow is throwing off the Bacillus Abortus Bang by the millions at this time. After several days the cow herself has taken care of the infection and it has gone to the udder as a resting place only to be given off in the milk probably.

The calf continues to discharge the Bacillus of Bang in the feces, in the urine and probably saliva for at least six months, then it is a negative animal in most cases until breeding age and is bred and picks up infection from some other animal.

The cow is again bred only to give birth to another infecting process.

The bull, if infected, is a dangerous animal to have in an Abortion free herd.

Conclusions.

Be honest with yourself, arrange a maternity stall and religiously use it, be very careful they are not infecting stalls.

Do not keep infected calves in the feed alley or near other cattle.

Do not keep clean cows exposed to infected cows at calving time.

A breeder owes it to himself, to the breeding industry, and to the public in general, to have a herd free from Tuberculosis and Abortion.

Do not keep a cow with either disease without properly protecting the other animals.

Do not buy infected animals and expect a profit from them.

Raise, buy and keep only the ones free from Abortion.

Keep Breeding Records, Butterfat Records, and have better cows.

Several of the States have regulations to control the traffic in cattle without a blood test for Abortion and found free.

TUBERCULIN TESTS OF EXPORTED CATTLE FROM PENNSYLVANIA CALENDAR YEAR 1926

Tested Unofficial Plan	315 Herds	4,426 Cattle	39 Reactors
Tested Official Plan	544 "	1,202 "	0 "
Total	829 Herds	5,628 Cattle	39 Reactors

7,695 Premises were disinfected during calendar year 1926

SUMMARY INDIVIDUAL AND AREA PLANS TO JANUARY 1927

Individual

Accredited	2,993 Herds	53,963 Cattle
Negative tests	4,155 "	46,891 "
Reactors last test	1,004 "	18,197 "
Total	8,152 Herds	119,051 Cattle

Herds	Accredited	1	year	1,017
"	"	2	years	672
"	"	3	"	537
"	"	4	"	372
"	"	5	"	252
"	"	6	"	113
"	"	7	"	27
"	"	8	"	3
Total				2,993

Initial herd tests conducted by Acc. Vets. 7,101
Retest of herds conducted by Acc. Vets. 5,400

Area

No. Counties	No. Townships	No. Herds	No. Cattle
45	531	72,870	451,601

7 Counties Modified Acc. Areas

Mercer
Crawford
Jefferson
Cameron
McKean
Butler
Clearfield

Complete County tests but not Modified

Lawrence
Indiana
Union
Potter

WAITING TEST

Individual

2,335 herds in 54 counties

Area

184 townships in 43 counties qualified.

TUBERCULOSIS WORK
INDIVIDUAL ACCREDITED AND AREA PLANS
ANNUAL REPORT
Calendar Year 1926

	Prac. Acc. Vets.			Fed. & State Vets			Total		
	Herds	Cattle	Reac.	Herds	Cattle	Reac.	Herds	Cattle	Reac.
Initial test applied	2,565	28,687	3,923	436	4,878	418	3,001	33,565	4,341
Retests applied	4,266	71,435	1,859	1,001	19,746	702	5,287	91,181	2,561
Additions applied	498	2,105	80	11	49	2	509	2,154	82
Sold from herds under Plan	66	278	2	1	3	3	67	281	7
Area tests applied	....	.....	....	38,570	246,750	13,942	38,570	246,750	13,942
Total	7,415	102,505	5,966	40,019	271,426	15,067	47,434	373,931	20,933

UNOFFICIAL PLAN CALENDAR YEAR 1926

2,795 Herds
24,939 Cattle
806 Reactors

TUBERCULIN TESTS OF IMPORTED CATTLE INTO PENNSYLVANIA CALENDAR YEAR 1926

Lancaster Stock Yards	8,538 Cattle	No reactors
Pittsburgh Stock Yards	3,441 "	29 "
Tested prior to movement into Penna.	20,227 "	No "
Total	32,206 Cattle	29 reactors

THE AYRSHIRE HERD TEST PLAN

C. T. Conklin, *Secretary, Ayrshire Breeders' Association*
Brandon, Vt.

"You can't tell the depth of the ocean by the height of the waves", mused a coast-wise philosopher, and he might have added that you can't tell a thing about the production of a herd of cows by studying a few of the highest records. As a matter of fact, the waves may roll the highest over the most dangerous reef,and similarly a few high records may be rolling over a hidden shoal of low production with the remainder of the herd. And for this very reason the Ayrshire Herd Test came into existence.

The first year's experience with the Herd Test indicates that it has a secure place in the program for the advancement of the Ayrshire. Nearly fifteen hundred of the breed's best cows are now monthly subjected to this investigation, and some fifty different owners promptly advised as to production, feed costs, and gross income for every cow in their respective herds. It is interesting to note that although there has been a serious decline in Advanced Registry testing, this is the greatest number of Ayrshires that has ever been on test at one time. Furthermore, there is every indication that it is simply the beginning of an increasing number of herds that will avail themselves of this service.

The inception of the Herd Test dates back some four years to a gathering of a group of men who were intensely interested in the progress of their favorite breed. The question was pertinently raised as to why every Ayrshire cow in the herds of the breeders who were testing should not be tested. It seemed to these far-seeing cattlemen that the truth should be known about the low producers as well as the high producers of the breed.

The idea challenged the attention of the officers of the Ayrshire Breeders' Association, and as a result in 1924 a committee, consisting of Major A. Henry Higginson, Dr. E. S. Deubler and Leonard Tufts, was appointed. This committee was instructed to study the systems of testing in vogue in various successful dairy countries and to offer suggestions for a test that would involve every cow in the herd, and at the same time furnish records that might be recognized by the Ayrshire Breeders' Association and given a place in the pedigrees of their cattle.

The investigation that followed impressed the newly-appointed Herd Test Committee with the radical difference between the objective of the American breeder doing Advanced Registry testing and the successful dairyman of other lands. One group was testing to detect the unprofitable cow and thus raise the averages of their herds, while the other group was devoted to a policy of making the largest possible records with a small number of their best cows. Seldom was a mature cow started on the Advanced Registry unless there was reasonable assurance that she would make a satisfactory showing.

Furthermore, these dairymen across the sea believed that every cow must be tested not only for one lactation period, but year after year with clock-like precision. The Herd Test Committee also found that there was no holding back of breeding so as to get high yearly records with fewer calves. There were no box stalls, and highly specialized feeding methods to keep the laggard cow in the race.

Perhaps still more important was the finding that the expenses of testing were greatly reduced in other countries by the organization of local associations, and the very general participation of all breeders in testing work. At the same time this committee found that the idea of organizing local associations for testing entire herds was sweeping through the leading dairy States of this country in spite of the fact that the Advanced Registry system was losing in popularity. With a feeble beginning of one lone cow testing association in 1906, there were 700 functioning in 1924. These associations were testing more pure-breds than all of the systems that were recognized by the various breed associations, which was rather conclusive evidence that the American dairyman would continue to test his cattle if an economic and practical plan were presented to him.

With the experiences of the dairy leaders of several countries from which to draw, plans were outlined for a system of testing that would involve every Ayrshire cow in each herd entered. There could be no sorting out of poor producers, shy-breeders and delude the breeder regarding his profits. The test automatically includes every heifer as she freshens with her first calf. All reports are based on herd averages although the records of individual cows will be maintained and published. The calendar year was selected as the basis of computation, rather than the lactation period, so that the dry months are figured in the annual report.

In order to make the Herd Test applicable to the conditions of the general farmer and the dairyman it was specified that mature cows should not be milked more than twice daily unless there was a production of at least 40 pounds of milk, with

proportionate yields for immature females. To give the monthly reports from the Ayrshire Breeders' Association to the various owners the economic value that they warranted, feed consumption and costs were incorporated, and charged against the production of each cow.

Economy of administration was secured by permitting the supervisor to test up to twenty cows each day. Furthermore, supervision was based on a one-day test with no preliminary milking, rather than the customary two-day test. Although the change to the one-day test seemed rather revolutionary, and there were many who considered it of little value, there has recently been published considerable evidence to support the theory that the one-day test is quite accurate.

It was further agreed by those who have developed the Herd Test that every record should be recognized, regardless of whether it met a certain arbitrary standard or not. "Let us know the truth about every daughter of our herd bulls," remarked one of these breeders in early conference, and the wisdom of this principle has never been questioned. The possibility of being led astray by the records of a bull's best daughters when he may have many other daughters of very ordinary ability seemed a very important consideration to these leaders.

Recent publications from the United States Bureau of Dairying have pointed out the difficulty of selecting herd sires that will just maintain production in a good herd, without even hoping to increase production. These governmental students of cattle breeding have long since recognized that the most accurate basis for studying the transmitting qualities of a sire depend upon having every daughter's record available. Supporters of the Herd Test are optimistic in believing that they will have a much more accurate record of the get of their herd bulls, when they can see the record of each daughter year after year, without a selection that has given an opportunity to just a few of the best.

Notwithstanding the reasonable theories underlying the Herd Test, it was generally believed that breeders would hesitate about exposing the actual production of every cow in their herds. But on the contrary the opportunity was welcomed. A dozen, a score, then fifty breeders lost no time in entering their cattle in the Herd Test. Here was a plan for breed improvement that meant the elimination of the poorer cattle rather than the exploitation of the best. These men realized that the Herd Test furnished proof to neighbors, breeders and prospective buyers that their herds were, first of all, practical dairy propositions, and, perhaps, second, Ayrshire breeding institutions. In some cases there was made a long deferred culling of the odds and ends that almost

invariably appear in the best of herds. Without exception these breeders are now glad that they removed the beasts that would have reduced their averages; and undoubtedly the breed has gained thereby.

WHO SUPPORTS HERD TEST?

The popularity of the Herd Test is well distributed through the various groups that are breeding Ayrshires. The largest number of entries are from the small farmer-breeder depending upon his cattle for a living. This group has enthusiastically received the Herd Test because it involves all the economic features of the Cow Testing Association, with which he is familiar, and also puts recognized records on his cattle at a minimum cost.

The larger breeding establishments are supporting the Herd Test because it helps them materially in their breeding problems, as well as in the selling of cattle. The dam of every bull calf is given a record. Since every daughter of the bull that may be a satisfactory or unsatisfactory herd sire is tested as she freshens, evidence is quickly accumulated regarding the ability of a sire. In the first six months of the Herd Test several promising bulls have been brought to light, and undoubtedly still others will be discovered. Since all Herd Test records are made under quite similar conditions the fairness of the comparison of different sires is quite apparent.

Still another group that seems quite well satisfied with the Herd Test are the busy men who enjoy the ownership of good cattle, and who must systematize their herds and all other interests in order to keep up with the progress of their own activities. The tabulated monthly report of the production of each cow together with a debit or credit for feed consumed furnishes a summary that visualizes conditions in the herds that may be only rarely observed.

CRITICISM OF HERD TEST

Of course, there are criticisms of the Herd Test plan. Most frequently the question is raised as to what the Herd Test will give that is not secured through the Cow Testing Association. Undoubtedly there is a more careful check and a standardization of methods in Herd Test supervision that does not obtain in all States doing cow testing association work. Furthermore, the identity of thousands of pure-bred cows that have made records in local associations has been lost, while the Herd Test makes each individual cow's record available for the public. It would indeed be most fortunate if all cow testing association records for individual pure-breds might be recorded in some manner.

Still another criticism is a questioning of the accuracy of supervision. With a maximum of twenty cows for each supervisor in a day, and only a one-day test the entire system has been subjected to a small degree of condemnation. Up to date there have been no unusually high records to support the contention that the system invites fraud. Good averages have been secured through consistency rather than exceptional producers. It is doubtful if it is as easy to practice deception that will increase the averages of a herd of twenty cows as to alter the record of one or two cows. With "surprise" tests the production of a herd may be checked at any time that it is considered advisable. As a matter of fact, there seems to be more consistency in the records of herds than of individual cows. But the most important reason for believing that there will be no more fraud with the Herd Test than with any other system of testing is the breeder, himself.

Perhaps the most valid criticism of the Herd Test is the fact that it works a hardship on the man owning cows of proven worth as breeders, some of which may be unsound or beyond their prime. Perhaps a herd with a collection of such rare old breeding matrons should not be entered in the Herd Test. The progeny of such cows will always be in demand regardless of whether the herd is on test or not. But for one such cow that should be retained there are probably scores that are being unprofitably maintained and contributing very little to the advancement of the breed. Rather than attempt to define the cows that should be excused when their stablemates are in the Herd Test, the present rules permit no exemptions.

But notwithstanding certain limitations, the Herd Test is recognized as a plan that should raise the standards and also standardize the rank and file of the breed. Undoubtedly the Advanced Registry will continue to focus attention upon the high producing individual, that will not receive so much glory from the Herd Test. On the other hand, it is reasonable to expect that the Herd Test will measure the value of the breed's best and also improve the lower level of the breed that should be either vealed or revealed.

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THE MINERAL REQUIREMENTS OF DAIRY CATTLE

E. B. Forbes, *Director, Institute of Animal Nutrition,*
The Pennsylvania State College

The subject of mineral nutrient requirements of dairy cattle is naturally of interest because milk is rick in mineral substances, and because there are many evidences of nutritive depletion and physiological derangement in the performance of the highly improved and heavy producing cow, in which mineral nutrients may be involved.

This subject, in its practical scientific relations, was opened up through a series of four years' studies by the speaker, and associates, at the Ohio Station, the results of which were published in the years 1916 to 1921.

These studies consisted of 60 mineral balance experiments, in which the accounting for all factors of income and outgo made it possible to determine whether the feeds used were able fully to maintain the cow, or whether she was obliged to draw on the mineral reserves of her own body—a process which is obviously limited, and which may lead to unfavorable consequences.

In these experiments, in which the income and outgo of 10 chemical elements was determined, it became apparent that calcium, on account of the large amount present in the body and in the milk, and because of the characteristics of its compounds as to solubility, occupies a dominant or key position in mineral nutrition, though phosphorus is also a prominent constituent, and the many other elements present in smaller quantities are no less important.

Among feeds, grains are comparatively rich in phosphorus, while roughage is richer in calcium; and among all feeds leguminous roughage stands in a class by itself in its high calcium content.

In our experiments at the Ohio Station the use of minerals was studied as affected by leguminous roughage as compared with other kinds, and as affected by mineral supplements added to calcium-rich as compared with calcium-poor rations. Protein was always present in excess, so that the use of mineral nutrients could not be limited by protein deficiency.

From among the many conclusions I shall state a few of the most important.

Liberal milk production, during the first half of the period of lactation, on normal winter rations, fed in quantities sufficient to maintain live weight and nitrogen equilibrium, invariably caused loss of calcium from the skeleton, in spite of obviously adequate amounts of calcium in the ration.

With large additions of calcium to these normal rations, in the form of steam bone flour, precipitated bone, calcium carbonate, calcium chloride, and calcium lactate, the calcium balances remained negative, that is, calcium was lost from the body, in all cases of abundant milk production, in spite of calcium intake varying from normal to excessive.

The mineral losses when the roughage was of leguminous nature were, on an average, somewhat less than when timothy hay was fed, but when mineral supplements were added to the normal basal rations the utilization of the added calcium was doubtful, and, at the most, slight and inefficient. Inasmuch, therefore, as the basal rations themselves were usually rich in calcium, it is obvious that deficiency of calcium was not the factor responsible for the negative calcium balances.

From these experiments it is obvious that in the selective improvement of the milch cow we have encountered limitations of capacity to assimilate mineral nutrients, especially calcium, before any such limitations are apparent in their ability to utilize the organic nutrients. But we shall see, later, that these limitations are not entirely in capacity to assimilate, but are in part the result of nutritive deficiences in feeds used.

The mineral constituents of the skeleton were shown to be more readily available for use in milk production than are the calcium compounds of the rations, and more readily available even than are water-soluble calcium compounds given as supplements to the ration.

From our last year's work, in which the experimental subjects were so chosen as to cover the entire year, in a disconnected series of observations, we obtained the following view of the mineral nutrition in the annual cycle of lactation and gestation.

Parturition turns loose a pent-up flood of nutriment which has been stored for the use of the calf. This outpouring of mineral-rich food proceeds in large measure independently of the food supply; that is, if the food is sufficient to maintain the life of the cow she will produce milk even though this involves extensive drafts upon the tissues of the body.

At some point between the middle and the end of the period of lactation, when the impulse to secrete milk has largely spent

itself, the milk production comes to be more definitely related to and dependent on the feed intake, and falls off, in amount, to such extent that retention of calcium becomes possible.

In the mean time the cow has been bred; the demands of the developing calf for mineral nutriment remain comparatively slight; and mineral storage in the cow's depleted skeleton comes normally to prevail.

It is obvious that a cow should have a dry resting period of sufficient length, and feed, during this time, in sufficient supply, to permit the entire replacement of the preceding mineral overdraft by the end of the period of gestation. The exact conditions necessary, however, remain to be elucidated.

Additional light has been thrown upon the subject of utilization of mineral nutrients by experiments of Hart, Steenbock, and associates at the Wisconsin Station.

These experimenters have shown that calcium can be stored by cows during liberal milk production under the influence of alfalfa hay which has been cured under haycock covers; and more liberal calcium storage was observed from green alfalfa than from alfalfa hay. Calcium was lost from the body if the roughage was timothy hay, or alfalfa hay which had been exposed to the weather for four days in the windrow, the loss being less with the alfalfa than with the timothy, and the loss with the timothy being somewhat reduced by the feeding of bone meal. Also the direct exposure of cows to sunlight improved the utilization of calcium, and was instrumental in bringing about calcium equilibrium in cows producing 25 to 30 pounds of milk per day.

H. G. Miller and associates of the Oregon Station concluded that cows could make a slight use of the calcium and phosphorus of bone meal, and that the feeding of fresh green kale improved the utilization of calcium.

From these studies subsequent to my own it appears that in spite of the usual prevalence of calcium losses during liberal milk production on winter rations, it is possible, under especially favorable conditions, that is, with direct exposure of the cow to sunlight, or with green forage, or alfalfa cured under haycock covers, for a producing cow to maintain herself without drawing on the calcium stores of her body.

The observations which I have made thus far have been derived from comparatively short balance experiments which do not answer the crucial questions as to the final mineral balance at the end of the year, as affected by the various conditions as to rations, and the use of mineral supplements, as affecting the mineral reserves, the annual milk production, the reproductive activity, and the state of health of the cow.

To answer these questions requires carefully controlled, long-time experiments under the conditions of practice. Of such evidence we are able to cite a very little. Thus, E. B. Meigs of the Bureau of Dairying, J. B. Orr and associates of the Rowett Research Institute, of Aberdeen, Scotland, and Lindsey and Archibald of Massachusetts, have conducted some long-time experiments to determine the value of mineral supplements added to the ration of the milch cow. There was evidence of some slight use of ground limestone in Meigs' work, while the other experiments were quite inconclusive, but in all of these experiments the mineral supplements were added to low-calcium rations which did not represent good dairy practice; so these investigations were not planned in ways to answer our most important problem,—the value of a mineral supplement added to a good normal ration.

So much for formal experimentation,—but mention should also be made of the informal observations of dairy practice under certain conditions as to feeding, especially as to soil and forage composition, which prevail in certain localities far removed from Pennsylvania.

Thus, where animals are fed on alfalfa, with little or no grain, a deficiency of phosphorus, instead of vitamin D and calcium, may be a disturbing and limiting factor in nutrition.

Also, in certain regions, for instance in a part of Minnesota east of the Red River Valley, parts of Texas, and extensive areas in South Africa, and Australia, the composition of the soil is so deficient in phosphorus as to cause a phosphorus deficiency in the forage, and serious disorders,—described in all text and reference books on veterinary pathology.

The soil in intensive farming regions may also be so acid and so poor in calcium and phosphorus that the roughage will be abnormally poor in these elements.

Under these conditions of *abnormal forage* the feeding of bone meal is of definite value. The question as to whether the forage *is* abnormal in composition, and, therefore, whether advantage may be expected from the feeding of bone meal, may be *raised* by the behavior of the cattle, but can be *settled* only by trial,—with much the greater likelihood that the answer will be negative.

Everyone knows that it is highly desirable to have leguminous roughage for cows. If it is necessary to use hay from the grasses or cereal straw, it may perhaps be helpful in avoiding weakness in calves, and premature birth of calves, to allow the cows free access to bone meal, but this should be regarded not as an established but as an experimental procedure.

If goiter is present in calves, or if there is other reason to suspect iodine deficiency in the feed, 2 grains of sodium or potassium iodide per day given to the cow during gestation will be enough to prevent this trouble.

A convenient way to measure out this iodide is to dissolve 1 oz. of sodium or potassium iodide in 1 gal. of water; one teaspoonful will contain approximately 2 grains. Or mix 320 grains of dry sodium or potassium iodide with each 1000 pounds of grain. For stock on pasture dry iodide may be mixed with common salt in the proportion of 4 grains to the pound.

As for the common salt requirement cows should receive as much as 1 to 3 oz. of salt per day, according to milk yield. Two ounces is enough for any but the very best cows.

If one wishes to experiment in the use of a mineral supplement for cows I would suggest a mixture of four parts of bone meal to one part of salt,—allowing the cows to run to this at will; but it is only under very unusual conditions that I would anticipate a beneficial result.

The extensive trade which has recently sprung up in mineral salt mixtures for cattle and the extensive use of commercial feeds containing mineral components, leads me to suspect that many good people have regarded the suggested possible influences of mineral supplements for cows as though these were established facts.

It is by no means certain that the mineral losses which have been shown to prevail during the early part of the period of lactation are not fully restored during the later part of this period, and while the cow is dry; nor has it been clearly shown that calcium salts added to rations composed of feeds of normal composition will materially improve the calcium balance of the animal.

This subject, therefore, requires further investigation. The commercial application of the suggested or alleged facts before they are established is certainly premature.

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ECONOMICS FACTS FOR THE MAN WHO MILKS COWS

E. M. Harmon, *Associate Editor, The Dairy Farmer,*
Des Moines, Ia.

Success or failure in dairying, as well as in practically any other business, depends to a large extent upon the economic environment in which a man places himself. It is true that some men will succeed under the most adverse conditions, while others will fail miserably in the most favorable environment. But with all, the degree of success or failure will be determined quite largely by the economic conditions surrounding them, and their knowledge of these conditions. For that reason it behooves everyone who is either running a dairy farm, or contemplating running such a farm, to make a study of these conditions, and to prepare to cope with them in the most efficient way possible.

The two outstanding important factors, outside of the personal element, which spell success or failure to the dairyman, are (1) The size of his farm and business, and (2) The receipts per cow. Some economists will tell you that one is the more important, and others the other. To my mind, we will probably be able to settle that question about the time we decide whether gasoline or oil is the more important in running automobiles. Volume of production, without a profit, means bankruptcy, and a profitable production, without the production, spells exactly the same thing. There are other factors which are important, including markets, diversifications, crop yields, weather, taxes, transportation costs, but these two are of such outstanding importance that we will confine our discussion to them.

SIZE OF THE FARM AND BUSINESS

It is a more or less common opinion among some groups that the salvation of American agriculture lies in small farms, cultivated on a very intensive basis. This idea is undoubtedly more prevalent in the towns and cities, though there can be no doubt but that many farmers share it. Those who advocate such methods will point to the intensive cultivation and high yields on some of the small European farms. They know that an acre feeds more people there than here, and seem to think no further. They fail to realize that while the income per acre is far more there than here, yet in many cases the income per family is much lower.

What we want in this country is man-size farms—farms which will yield maximum income per man or per family. It is certain that the size of the farm or the amount of a man's capital may be so limited that he cannot do this. A splendid illustration of the effect of sufficient capital on a man's earning capacity on a dairy farm is shown by Warren, of Cornell University, in a survey of 578 dairy farms in Livingston County, New York. After allowing for interest, taxes, depreciation, and all other items of expense, he found that the farms with less than $5000 capital showed an average labor income of $291 a year. They also found that the greater the capital, the greater the labor income. Those with a capital of $15,000 to $20,000 had a labor income of $1,001, and those with over $30,000 had a net of $1,691, after paying all expenses, including interest and depreciation.

In the same way he found on 1,988 farms in Tompkins, Jefferson, and Livingston counties, that the larger the farm, (within reasonable limits), the greater the labor income. The farms of 30 acres and less showed a net labor income of only $121, while those of 150 to 200 acres, yielded $776, and those over 200 acres, $995.

These same results have been confirmed by Thompson and Dixon, and many others in Indiana, Illinois, Iowa, and other states. The man-size farm, with ample operating capital, must always be the more profitable, and the more conductive to a high standard of living on the farm. It has many advantages, among which are: (1) It is possible to maintain more productive units, per unit of man and horse labor; (2) Larger farms use horse labor more efficiently; (3) Larger farms use machinery more efficiently; (4) Larger farms use capital more efficiently, and have less capital per productive unit involved; (5) Contrary to popular opinion, large farms produce as great or greater yields per unit, than do small ones.

Because of the fact that the amount of capital and the size of the farm are so important, as factors in determining net income, the man on a farm with limited resources, or the young man starting out, will do well to consider seriously the possibility of renting part or all of his land. The volume of the business is so important a factor in making for success, that everyone owes it to himself to secure control of as much land and capital as he can control, without its becoming unwieldy.

RECEIPTS PER COW

The man with the low producing boarder cow is in a hopeless position. There is nothing this side of heaven, other than a change of practices, that can save him, so far as his dairy business

is concerned. Volume of business only makes his position the more hopeless. Lowering his taxes, bettering his markets, and increasing his crops, only postpones the day when the boarder cow will consume the last of his capital, or reduce his standard of living.

Warren found that on over 38% of the farms surveyed in New York, that the men would have been better off had they kept no cows at all. Their time spent working with cows, instead of making them something, was actually losing them money. They would better have spent that time in the shade, or around the fireplace.

D. C. Wood, of Missouri, found that on strictly dairy farms, where there was an average of 207 pounds of butterfat per cow, there was an average labor income of $94. Where the average was 249 pounds of fat, that income was $1,423, and where it was 225 pounds, the average man received $601 for his year's work. It might be roughly said of this survey, that the first 200 pounds of fat represents the cost of production, and that all over and above that represents profit. Mr. Wood goes further to state, "The one factor which seems to govern profits more than any other on the dairy farm, is production per cow. For that reason the cow testing association is the one surest method the dairyman has for increasing profits."

If we are to raise our standard of living on the farms, the inefficient producer must go, as must the methods which make for inefficient production. Not long ago I saw two cows in adjoining stanchions in the dairy barn of a middle western dairyman. These cows were both good looking grade Holsteins. One looked as good as the other, but the records showed that it took $1.86 worth of feed to make a hundred pounds of milk from one, and 93 cents from the other. A tabulation of the records of about 8,000 cows in Iowa associations last year, showed that feed costs of producing butterfat varied from 17 cents with the 500 pounds producers, to 33 cents with the 100 pound producers. If we will multiply these feed costs by two, we will get approximately the total farm cost of production. It is no wonder that some men are making money on farms, while others are losing. It is no wonder that many men are dropping by the wayside, because they are not good enough business men to keep the pace. Many more are doomed to drop out in the next few years. But I am not pessimistic over the outlook. The American farmer is already the most efficient in the world. He is more efficient than many classes who style themselves as business men. The farms of tomorrow, and particularly the dairy farms, are to be most highly specialized businesses. As such, they demand the best of managing ability.

Times are changing. We are living differently. Our standards of living are rising. We cannot have these eight or ten million "boarder" cows, and the methods which make them "boarders", and at the same time enjoy the highest standards of living. The American dairyman must meet the issue squarely through improved breeding, feeding, management, and culling practices.

SOME RESULTS OF INVESTIGATIONS

T. E. Woodward, *Dairy Husbandman in Charge of United States Dairy Bureau Farm,* Beltsville, Maryland

Some Results of Investigations at the United States Dairy Bureau Farm, Beltsville, Maryland—Sprouted Oats for Shy Breeders; Sour Milk for Calf Feeding; The Closed Barn vs. Open Shed for Dairy Cows; Effect of Frequency of Watering Cows Upon Milk Production; Feed Cost of Raising Heifers; Results of Milking Dairy Cows Three or Four Times Daily Instead of Twice; Effect of Exercise, Change of Milkers and Box Stalls on Milk Production; and Relative Value of Alfalfa to Grain, etc.

Dairy farming may be made more profitable in several ways. First, by getting a higher price for the product; second, by using better cows; third, by according better care; fourth, by more careful feeding practice and, fifth, by the proper use of home-grown feeds. It is this last about which I will speak first.

Under ordinary conditions dairying is an industry which will not support itself. What I mean is this: If a person undertook to run a dairy herd, buying feed, hiring all the labor and selling the product at current wholesale prices, he would make little, if any, profit. I have prepared a few figures which will support this statement.

Under the conditions which prevail in the vicinity of Washington, D. C., a cow that produces say 7500 pounds of milk in a year testing 4 per cent will eat about $150 worth of feed. The labor cost will be at the rate of about $5.00 per cow per month or $60.00 a year. The animals which must be raised or bought to replace the cows discarded on account of inefficiency, failure to breed or other causes will cost probably $20 per cow per year. The bull service and bedding will cost about $10.00 a year which makes a total cost of keeping a cow one year about $240. By crediting the cow with $30 worth of manure (and I would not care to buy much at this price) and a calf at $5.00, the net cost of keeping such a cow for one year is brought down to $205., which means a cost of 24 cents for a gallon of milk at the farm and this does not include the cost of incidental or running expenses or taxes. Nothing is allowed for depreciation of buildings

nor is the interest on investment charged, if this last can be considered a proper expense in this connection. Now the average Washington price for milk for the year 1926 was 34 cents a gallon for 7 months and 30 cents a gallon for 5 months which means a net price at the farm of about 29 cents.

These prices are for milk which is used for consumption as such rather than the milk which is classed as surplus which of course commands a much lower price. You will see therefore, that a person could not expect a profit of even as much as 5 cents a gallon, which is entirely too small a margin for a person to operate under with any degree of safety. Now these figures are given roughly just to show that with average to good cows a person cannot buy all the feed and hire all the labor and expect to make more than a very little profit out of the dairy business, that is, if he disposes of his milk at current wholesale prices.

He must raise some at least of his own feed and the more productive his farm and the more of the feed that he raises, the better off he will be because there is no doubt that feed can be raised cheaper than it can be bought. Economical milk production is just about as much a matter of crop production as it is a matter of proper handling and feeding of dairy cows. The most successful milk producers are those men who are the best farmers.

Under our conditions at Beltsville the hay that we buy costs us $30 to $40 or more a ton. We can raise hay for $15 a ton. Raising all the roughage including grass for pasture instead of buying it will make a difference in net profits under our conditions of about $45 or $50 a cow a year. Is this worth while? Certainly a person should raise all the roughage at least, whether he should also try to raise all the concentrated feed I am not prepared to say. There should be a proper balance between the size of the herd and the production of the farm. If the farm is overstocked it means buying feed and obtaining a doubtful return on the outlay. If the farm is understocked it means selling feed which as a rule can be marketed at a higher figure through the dairy, especially when we consider the cost of putting such material as hay on the market.

Now if a person is going to have the proper amount and kind of cow feed year after year it will be necessary to establish a definite crop rotation and then stick to it. We have paid much attention to the growing of crops at the Beltsville station. The farm foreman prepares a statement each day as to the number of hours each of his men work on each of the different fields and the number of mules or horses that are used. All of the produce is weighed as it comes into the barn or the silo. Accurate account is kept of all the fertilizer, manure and seed used. This has been

kept up for the past 12 years with the result that we can tell which crops under our conditions are the most profitable. The result of these records is that we have settled upon corn, alfalfa, and pasture grass as the crops which are the most profitable. Consequently our rotation is corn 3 years, alfalfa 3 years, and the same thing over again. The pasture being more or less permanent does not figure in the rotation.

Now do not understand me as advising this same rotation for all conditions. What I would advise is that each individual farmer determine the kind and number of stock that he expects to maintain and then plan his rotation so as to supply this stock with the needed feed without either great surplus or deficit.

The crops that are the most profitable for us to raise are not necessarily the most profitable for you. It is no big job for a person to keep a record of the time and expense required to grow each of the various crops and to estimate the yield and value of each. In my opinion such records are just about as essential to intelligent dairy farming as are the records of the individual cows. Besides they will add immeasurably to the enjoyment which a person will get out of farming. It seems to me that every farmer should have a map of his farm and that the dimensions and the area of each field should be known. It will be found that knowing the dimensions of the field are a great help when a person is sowing seed or applying lime because he can figure before the work has progressed to any great extent whether the proper amount of material is being put on the field. Unless he has this knowledge he is liable to find that he has run short of material or has some left over.

There are certain crops which every dairy farmer should raise. One of them is legume hay. This should be done both for the sake of properly nourishing the dairy cows and also for the sake of the fertility of the farm. Whether this crop shall be alfalfa or some other legume is a question for the individual farmer to decide and he can easily do this by keeping a few records. We found at Beltsville that alfalfa was a surer crop than clover and that it yielded a great deal more and showed more profit than cowpeas or soybeans. However, this may not be the case under the conditions where many of you operate.

Corn is another crop every dairyman should raise. It yields heavily, is a sure crop and is a good feed for cows, whether as silage, fodder or grain. Let us not get so enthusiastic over some of the new crops as to forget that when all is said and done, nothing will supplant corn for either silage or grain.

Under most conditions I believe it is advisable for a dairyman to make use of pasture grass, not that it will cause the cows

to yield any greater amount of milk but rather because pasture grass is the cheapest kind of feed that we have, because it is a natural feed for cows and is apparently quite valuable in furnishing certain nutrients for the dairy cow. Another reason for using pasture is because on many farms there is land that is too rough or wet to permit the growing of other crops successfully. This land can be put to good use as pasture.

It seems to me that pastures as a rule are apt to be neglected. The result is that the grass does not make as much growth as it should, the cows are forced to travel for long distances for the required amount of feed, and in the latter part of summer the pastures are liable to become so short as to make necessary heavy feeding of other material in order to keep up the flow of milk. Anyone having a pasture should first see to it that the pasture contains the kinds of grasses which will be best suited for his conditions. Next he should take care of the pasture by applications of manure or fertilizer, see that it is not grazed too closely late in the Fall and that the cattle do not tramp it to pieces in wet weather. I am sure that the carrying capacity of pastures may be greatly increased, perhaps doubled in some cases, by giving them more attention.

You have no doubt read much in the papers about the improvement of pastures, particularly the use of sweet clover instead of bluegrass. At Beltsville we are not in a section of the country where bluegrass is native to the soil but we have made some comparisons of sweet clover with a pasture mixture composed principally of orchard grass, timothy, red top, red and alsike clover. Of these grasses it is the orchard grass which seems to be the best for our conditions. We find that the sweet clover yields a little more pasturage than the grass mixture but we also find that it costs more since it has to be reseeded every two years. So, the cost of each day's pasturage is about the same for the sweet clover as it is for the grass. We also find that the orchard grass comes on earlier in the Spring than the sweet clover and that it is not damaged as much by tramping as is the sweet clover. When cows are changed from the sweet clover to the grass pastures the milk yield is increased; when a change is made from the grass to the sweet clover pasture the milk yield is decreased. It seems to be pretty generally understood in some sections of the country that sweet clover is superior to bluegrass for pasture. Whether it is also superior to other grasses is still a question. So much for the growing of crops.

There is another matter which should concern all dairymen who are raising calves to take the place of the cows that are retired from the dairy on account of inefficiency or for other reasons.

I refer to the selection of a bull. Of course the only way we can judge accurately the value of a bull is by examination of his daughters that are milking. Still we cannot always use proved sires. The young bulls must be used else they would never become proved sires. In selecting a young bull naturally we want to get one from a dam with a good production record. But let us remember there are records and records. Some are made under ordinary farm conditions where cows are confined in stanchions, milked and fed twice a day, fed only such amounts as will keep them in reasonably good condition and are bred to freshen about each 12 months. Other records are made under higher pressure. The cows are kept in boxstalls, they are milked and fed 3 or more times a day, they are fed enough to keep them fat and breeding is withheld. These are what we call test conditions. Obviously a cow will yield more under such conditions than she will with only ordinary feeding and care. This must be taken into consideration when the records behind the bull are inspected. Work at Beltsville, Md. shows that a cow which will produce 400 pounds of fat under ordinary conditions will produce 600 pounds under test conditions in which the cows are milked 3 times a day. 4 times a day milking would have increased the difference still more. The average increase in production as shown by our results was about 50 per cent.

Following this matter a little further possibly some of you are wondering if cows will produce 50 per cent more when given extra feed and attention, will it not pay to handle the whole herd in this manner.

What we found at Beltsville was that if the milk was estimated to be worth 40 cents a gallon, it made no difference in the profits whether the cows were kept under ordinary conditions or the so-called test conditions. Figuring the milk above 40 cents the test conditions paid better. Figuring the milk below 40 cents ordinary conditions were the better.

When we found that cows would produce 50 per cent more under the test conditions we were interested in finding out the effect of each of the factors entering into this increase with the idea that perhaps some of them could be profitably used with the regular herd. First we tried the effect of keeping the cows in boxstalls instead of stanchions. To do this we selected a number of cows immediately after freshening and kept them in boxstalls and stanchions alternately for periods of 40 days for the entire year. We found that the boxstalls increased the production less than 5 per cent which was not enough to pay for the extra bedding used. By the way, we found that the bedding used in boxstalls was about 14 pounds per cow per day, while in stanchions it was

4 pounds and since straw costs us from $12 to $16 a ton this matter of bedding is of considerable importance. Then too, the labor of taking care of cows in boxstalls is much greater than where they are confined in stanchions. The result is we do not advise boxstalls for any cows except those which may be sick or ready to calve or when maximum production is desired regardless of expense.

Then we tried to find out the effect of milking 3 times a day instead of twice. We did this by taking a number of cows immediately after they freshened and milking them in alternate periods 2 and 3 times a day for 40 days. As with the boxstalls this experiment lasted for a whole year. We found the average increase to be about 12½ per cent which is somewhat less than many persons have estimated.

We were not altogether satisfied with this experiment because it was thought the good effects of 3 times a day milking were carried over into the 2 time a day period. Likewise that the effects of the 2 times a day period were carried over into the period when the cows were milked 3 times a day, the result being that the differences between the 2 methods of milking were not as great as they should have been. We are now running some cows for whole lactation periods without changing the manner of milking. For example, a cow that is milked twice a day this year will be milked 3 times a day next year and twice a day for the year after. The results so far indicate an increase of about 18 per cent due to 3 times a day milking but these results are only tentative. It is awfully hard to get a cow under the same conditions in every way from one year to another. The result is that there is no uniformity in the results that we have obtained so far by comparing whole lactation periods. The percentage increase from milking 3 times a day has varied from nothing up to as high as 60 per cent. You can readily see that with such a difference in the range of increase it is very hard to strike a reliable average and this is the reason that I say that the 18 per cent increase should be considered only tentative. What we have found out definitely, however, is that cows milked 3 times a day will hold up in their production for a longer period than those that are milked twice a day.

Now then as to whether milking 3 times a day instead of twice would be an economical practice is something which each farmer could better figure for himself. For short periods he could estimate an increase of 12 per cent. For longer periods he could probably figure 18 per cent. He would have to know how much the extra milk would cost him and how much the extra production would sell for. In addition to this he would have to allow additional feed for the cows milked 3 times a day on account of the

extra production. This increase would amount to 1 pound of grain to each 2 or 2½ pounds of milk. I am inclined to think that under most conditions it will not pay. However, in some dairies that are getting a high price for their milk and drawing the milk with machines, milking 3 times a day may be profitable.

During the remainder of the time which has been alloted to me I will try to cover briefly the subjects on which I am scheduled to speak according to the programs which you have.

In many dairies, especially the larger ones, the cows are milked just as they come rather than certain cows by certain milkers. The question arose as to whether as great production would be secured by such practice. Accordingly 12 cows at Beltsville were divided into three groups. Each one of 3 men milked a certain group of 4 cows for 40 days without change, then all 12 cows were milked by the 3 men in such a way that no cow was milked twice in succession by the same man. This period of 40 days was followed by another period, the same as the first. The increase due to regular instead of changed milkers amounted to less than 1 per cent, so it appears that cows may be milked by whichever method seems to be most convenient under the circumstances.

To determine the efficiency of the open shed method of stabling cows as compared with the closed barn, the entire herd of cows was divided into 2 groups. One group was kept in the open shed, the other in the closed barn. The following year the two groups were reversed.

The results showed that the cows in the open shed produced slightly more but also ate a little more. Contrary to expectations the open shed did not save any labor if the cows are taken to a separate room or stable to be milked as was done in this experiment. It was found, however, that the manure was handled more economically in the open shed and that the open shed constitutes the very best known method of collecting and preserving all of the valuable constituents of the manure.

While 68 per cent more bedding was used in the open shed it was found that the cows kept cleaner than in the closed barn. Also, that coarse materials such as corn stalks could be used successfully for bedding in the open shed while they could not be so used in the closed barn. In this experiment the cows were not confined at feeding time. The boss cows fought the more timid ones away from the feed and this resulted in much less milk from the timid cows. It is thought best to confine the animals at feeding time so that each one of them will have a chance to get the proper amount of feed. It is also necessary of course to have all the cows dehorned in order to prevent serious injury.

There has been considerable speculation among dairymen as to whether cows required or would respond to exercise as some other animals do. To determine this we made a group of cows walk a measured distance of 3 miles a day, 2 of which were in the morning and one in the afternoon. At the same time a similar group of cows was kept in the stable without any exercise at all. At the end of 40 days the groups were interchanged and the experiment conducted for another 40 days. It was found that exercise increased the amount of milk a little over 1 per cent and that it made the milk slightly richer in butterfat, but the outstanding feature of the results was that the cows required 8 per cent more feed. No difference was observed in the health of the animals whether they received exercise or not. Our conclusions were that enforced exercise was not a matter of economy and that cows did not need any more exercise than they would get by moving about a yard for a short period each day.

The quantity of water required by a dairy cow depends mainly upon three factors: air temperature, quantity of milk yielded, and the amount of succulent material in the ration.

It was found that cows in hot weather drank about 80 per cent more water than in cold weather, also that the water consumption in moderate weather was about the same as in cold weather. It also appears that cows yielding 40 pounds of milk a day will drink at least 50 per cent more water than similar cows yielding one-half as much. Low producing cows in the winter often refuse to drink water more than once a day even when offered to them twice. The time of greatest demand for water is immediately following the eating of dry roughage. The greater the quantity of succulence in the ration, the less will be the water drunk. A cow yielding 24 pounds of milk a day was known to go 7 days without drinking when her ration contained a large quantity of roots.

These experiments indicate that allowing cows free access to water results in a slightly less intake of water than allowing them to drink twice daily, particularly if watering takes place after hay or other dry roughage is fed. About 13 per cent more water was taken when offered to the cows twice a day instead of once. Free access to water gave nearly 3 per cent greater milk production than watering twice a day and about 4 per cent greater than watering once a day. Good producing cows showed a little greater increase than this from frequent watering and low producers much less than 4 per cent. The cows used in these experiments were low to good producers, the daily milk yield being from 10 to 50 pounds per cow and the water consumption 30 to 100 pounds.

We have always been led to believe that one of the fruitful causes of indigestion of young calves is the feeding of sour milk. My attention was directed years ago to the fact that infants were being fed sour milk with good results and this led to an experiment comparing the feeding of sour milk with sweet milk to calves.

We found that the sour milk was not as palatable as sweet milk but that if the milk was not too cold the calves would take it without difficulty. The main trouble in feeding sour milk is the fact that it cannot be warmed without wheying off and making cottage cheese, so it is necessary to feed it cold. In the winter time we found that this cold milk chilled the calves. They did not like it and they would not thrive so well as those fed upon the sweet milk which could be warmed. However, in the summer-time, which is the season most difficult to keep milk sweet, we found that the sour milk gave just as good results as the sweet milk and that in no case did it cause scours. It appears that a person raising calves should not hesitate to feed sour milk, that is, if it is clean and decomposition has not set in; also that it is not worth while for a person to go to any expense to keep milk sweet for calf feeding in the summer-time.

Some dairymen at times find it necessary to buy both hay and concentrated feed. While cows of course need both kinds of feed, still it is possible to substitute one for the other to a certain extent. If hay is cheaper than concentrates according to the nutrients contained, a person can feed all the hay that the cows will take and reduce the grain allowance. On the other hand if concentrates are a better buy, the hay allowance can be limited and the nutrients supplied by a greater quantity of concentrates. According to the methods of evaluating feeds which are now in use, when alfalfa hay is worth $25.00 a ton, the mixture of concentrates as used in this particular experiment could be estimated to be worth as little as $34.00 a ton or as high as $55.00 a ton which you will note is a very wide difference. Our results showed a value of $46.00 for the concentrates or in other words—1 pound of grain mixture composed of 150 pounds hominy chop, 150 pounds wheat bran, 50 pounds old process meal and 100 pounds cottonseed meal—was equal to 1.85 pounds of No. 1 alfalfa hay.

As to the sprouted oats, I will give you some data just as it was given to me by Dr. Fred W. Miller who has charge of this work at Beltsville. The idea in feeding sprouted oats is to add vitamine E "or something" to the ration of female animals that are slow in conceiving. No claim is made that such feeding is likely to change any pathological conditions of the genital organs. Oftentimes cows fail to conceive when there is apparently nothing wrong with the genital organs that can be detected by an examination. It was thought that these animals would be the ones most likely to be benefited from the feeding of sprouted oats. So far 16 animals fed sprouted oats became pregnant. Three animals with pathological conditions in genital organs sufficient to be considered hopeless became pregnant after feeding sprouted oats. Two similar animals did not become pregnant. The average length of time that sprouted oats were fed was 68 days. The amount fed varies from 2½ to 5 pounds of the dry oats per cow per day. At present 17 female animals are receiving the oats. The plans are now to feed heifers before time to start breeding. Also to feed sprouted oats to bulls, both herd sires and experimental bulls and study the effect on their spermatozoa.

BANQUET

PENNSYLVANIA DAIRYMEN'S ASSOCIATION

Harrisburg, Pa., January 19, 1927

Masonic Temple, 6.30 P. M.

President, A. A. Borland, State College, Pa.

Secretary, Robert F. Brinton, West Chester, Pa.

Toastmaster, Dr. L. M. Thompson, Montrose, Pa.

Speakers

Frank P. Willits, Retiring Secretary of Agriculture

"Prof. Happy" Goldsmith, of the Philadelphia Dairy Council

Ralph D. Hetzel, President of Pennsylvania State College

A. J. Glover ..... "Making Dreams Come True"
Editor, *Hoard's Dairyman*, Ft. Atkinson, Wis.

Charles G. Jordan, Secretary of Agriculture of Pennsylvania

Announcement of Winners in Dairy Products Exhibit
George Taylor, State College, Penna.

Presentation of Trophies to the Three Most Outstanding Bull Associations in Pennsylvania During 1926
S. J. Brownell, State College, Penna.

Presentation of Awards to Owners of High Producing Herds in Cow Testing Associations During 1926
C. R. Gearhart, State College, Penna.

Song Leader
W. Horace Harper, Exc. Sec. Baltimore Dairy Council

ADDRESS

Hon. Frank P. Willits, *Retiring Secretary of Agriculture*
Commonwealth of Pennsylvania

My chief reason for accepting the invitation to address this splendid gathering of men and women, who are interested especially in the dairy industry, is to express my appreciation of the splendid cooperation you have given the Department of Agriculture during my administration. The people who live on the farms and the State Council of Agricultural organizations have all heartily supported the efforts of the Department to advance the interests of Agriculture in the State.

I should like to say a word about two matters that have recently developed, both of which particularly concern dairymen.

The first of these is so-called "Viscolized" milk. By running the milk through a cream separator, then "viscolizing" the cream, that is, subjecting it to high pressure, and then remixing the cream with the skim milk, there appears to be a much larger amount of cream in the milk than is normally the case. In fact, when milk is put through this process the cream often appears to occupy nearly half the milk bottle. This is a deception upon the public inasmuch as it would lead the consumer to believe that he was getting a richer milk than he was actually receiving. In fact, it has been asserted that some dealers skim about 2% butterfat out of the milk and then by viscolizing the remaining cream and remixing it with skim milk, make the product appear to have as much cream as was contained in the original milk. Prosecution has recently been brought against certain milk dealers who were distributing "viscolized" milk and it is the expectation that the practice will be stopped.

The second matter of particular interest to dairymen is the provision for a change in the law concerning the payment of indemnity of animals condemned for tuberculosis.

At the present time the law provides for increased indemnity for "registered" animals. Nothing is said concerning the fact that animals must be "pure-bred" to command the increased indemnity. As the law exists at present the Secretary of Agriculture has no discretionary powers. He must pay the larger indemnity to the owners of any "registered" animal. There is nothing to prevent a body of men getting together and forming

a register for brindle cows, or a register for three teaters, and then demanding increased indemnity because the animal condemned was "registered." This situation makes possible considerable complication and should be remedied at the coming session of the Legislature.

I take this opportunity in closing, to wish you "God speed" in your work and the fullest measure of success to the dairymen, the Dairymen's Association, and the dairy industry in the great State of Pennsylvania.

EXTRACTS FROM THE ADDRESS OF R. D. HETZEL

President Pennsylvania State College, State College, Pa.

The President of your Association has requested a copy of my brief talk to you upon the occasion of the annual banquet, held in Harrisburg, to be incorporated in the published proceedings of the annual session. I have had to confess to him that such a manuscript has not been prepared and that my faulty memory does not sufficiently serve me to make it possible for me to recall the substance of my address.

I am going to presume, therefore, to take this opportunity to extend to the dairymen of the State my most cordial greetings and to express to them my deep appreciation for the cordial and kindly welcome which I have received at their hands. I am fully conscious of the significance of the public trust which I have assumed and I am most anxious to prosecute it in such a manner as to best serve the interests of our Commonwealth.

I appreciate the importance and the dignity of agriculture and I have the highest respect and the sincerest regard for those who are engaged in this great enterprise. The land grant colleges of America were brought into existence for the purpose of serving sympathetically and intelligently the needs of the great body of the people of our young democracy. They were created in order that there might be institutions of public learning whose business it was to serve our industries, our social institutions, our political conceptions, our spiritual life, in such manner and degree as would advance the well-being and serve the idealism of our new democratic State.

This splendid mission has been faithfully and efficiently served by these public institutions of learning. They have served to democratize idealism by demonstrating that there is idealism in the every day interests of life. They have made clear to the youth of America the fact that there is idealism in the development of a perfect dairy cow or in the perfection of an intricate engine as well as in a beautiful picture or a stirring poem. The task, however, is not yet completed. Every day brings its new problems. If our standard of living is to be protected and advanced and our democratic institutions and ideals are to be kept vigorous and

undefiled, public education must be constantly extended and strengthened.

We need additional scientific research, our agencies for the dissemination of helpful information need to be extended and the teaching of our colleges must be made equal to the task of training leaders for the more exacting demands of the new day.

In the exercise of this trust I ask the sympathy, counsel and active support of the farming people of our great Commonwealth.

"MAKING DREAMS COME TRUE"

A. J. Glover, *Editor of Hoard's Dairyman*, Fort Atkinson, Wisconsin

A meeting of this character should give opportunity to build air castles, dream of the future, and reflect upon the past. Laying plans for the building of fortunes should stimulate sound thinking and give zest to life. Through contact we gain information which assists us to develop and direct our enterprises. The knowledge we gain on such occasions is not the largest benefit but rather the gathering of new visions and the grasping of new opportunities profit us most.

It is my privilege to relate briefly factors essential to making dreams come true in the field of dairying. What is the dairy industry? How important is it to the welfare of our country? What has been done to develop this industry and what is there yet to be done to carry it forward and upward?

Too many people consider the dairy industry small and insignificant. Only a few comprehend that the income from dairy products, by-products, worn-out dairy cows, veals, etc., amounts to nearly one-fourth of the total agricultural income of the nation. If we had a few places where the dairy industry were concentrated like the meat industry of Chicago or Buffalo, it would make itself more impressive, although of no greater importance. The dairy industry is scattered and made up of small units which do not emphasize its immensity or importance. The very fact that the dairy industry is made up of local units directed by persons patronizing them gives it a vitality and a strength that is of tremendous importance in directing this industry and in establishing it upon a firm and solid foundation.

In 1925 we produced over 116,000,000,000 pounds of milk. We are unable to comprehend even so much as a million pounds of milk, and over 116,000,000,000 pounds cannot be visualized; 116,000,000,000 pounds of milk would fill a canal 16 feet wide, as deep as the Erie canal, for a distance of 3,170 miles, or equivalent to the distance between New York and San Francisco. If it were put into tank milk cars, it would take a train 34,462 miles long to carry it, or eleven trains running parallel across the continent. When we begin to comprehend the dairy industry in this manner, we do, to some extent, grasp its vastness.

We are gradually educating the people to consume more dairy products. Ten years ago we consumed 78 billion pounds of milk as compared with over 116 billion pounds in 1925, or an increase of 50 per cent. Part of this is accounted for by the 17 per cent increase in population, but the interesting thing to the dairy farmer is the fact that the annual per capita consumption has increased from 790 pounds to 1,012 pounds, or 28 per cent. Put in another way, in 1915 the per capita consumption was 1 quart of milk daily, and in 1925 it was one and one-third quarts. This extra consumption of milk calculated at a very nominal farm value returns to the dairy farmers over $500,000,000 a year. This increase indicates conclusively the value of letting the consumer know the importance and value of dairy products and the necessity of producing higher quality products.

What can be done to improve this great dairy industry and make it still more profitable to those engaged in it? The foundation of this industry is the 23,600,000 cows. What kind of cows are they? As near as can be estimated, one-third of them do not pay for the feed they consume, one-third pay their board, and the other one-third make a profit for their owners. We would effect a tremendous improvement in the dairy industry if at least one-fourth of them were sold.

It requires but a moment's reflection to determine the tremendous investment to provide for keeping 6,000,000 cows. The investment in barns alone, to say nothing concerning the land necessary to raise the crops for feeding these cows and for housing the people who take care of them, and wagons and trucks for hauling the product to market, and factories for manufacturing the product, amounts to $750,000,000, conservatively estimated. The interest on this amount is a tidy sum.

How shall we proceed to locate these poor cows? The answer is through the cow testing association—the best method of discovering them and brings the farmers face to face with factors and conditions over which they have complete control.

In a report of a New Hampshire cow testing association made some years ago, I found this statement, "Thirty per cent of the cows in testing associations during 1922 did not return a net profit, although these herds averaged 61 per cent higher in production than the general run of cows in the state. The average record of 1,556 cows belonging to testing associations was 6,100 pounds of milk containing 244 pounds of fat."

According to the bulletin just quoted, New Hampshire has 96,000 dairy cows and of these probably not over 50,000 are producing milk that warrants a profit. The remaining 46,000

cows are surplus producers and the milk from these profitless cows, to a large extent, determines the price of market milk.

Every person who has had an active part in the management of a co-operative marketing association knows how a little surplus or homeless milk, as some have termed it, affects the price. One of the most striking illustrations that I have observed was found by the officials of the Virginia Extension Service in their work among the dairy farmers of Virginia. A dairy farmer who owned 36 cows, and making no money, became a member of a cow testing association. After the milk of each cow had been weighed and tested for a period of one year, the records were tabulated and it was discovered that 18 of them were profitable cows and the other 18 did not pay for the feed consumed. It is worth while to think about this Virginia dairy farmer working early and late in order to earn money with 18 good cows to help pay the cost of keeping the 18 poor ones.

If their drag did not extend beyond the bounds of the farm, it would not be so bad. No one would be penalized but the owner of these cows. The price of milk in the city, where the product of this farm went, was too low to be profitable and the owner had complained that a higher price should be paid for the milk. It was plainly evident that the price of milk was too low, for it was not returning the cost of production. The price was no higher because there was a large surplus, and there was no by-product into which it would be turned to yield the manufacturer a profit. The astounding fact is that the 18 poor cows produced in one year 71,000 pounds of surplus milk and the city had an oversupply of market milk.

What is the solution of a situation of this character? The answer is obvious—dispose of the poor cows which produce the surplus milk. It requires no profound reasoning to take a step of this character. It is simply a good business practice to dispose of all cows that do not pay for feed consumed and, in the main, the producers of surplus milk.

COWS STARVE FOR PROTEIN

It is not enough to have good cows; they must also receive the right rations. Our dairy herds of 23,600,000 dairy cows are underfed, and it is my estimate that we are not producing more than enough protein to meet the requirements of but 19,000,000 cows. If it were possible to take the feed which the nearly 24,000,000 cows consume and give it to but 19,000,000, I am inclined to believe that as much milk would be produced and the returns from the 19,000,000 would be far greater and the profits many times larger. The cows in our country, as a whole, are

being starved for protein. Dairy farmers of this nation should raise more legumes; that is, alfalfa, red clover, and sweet clover, for they not only provide an adequate quantity of protein so essential for milk production, but they are beneficial to the land, increasing in it both nitrogen and organic matter.

MUST PUT HONOR IN PRODUCTS

We have many opportunities to improve the quality of our dairy products. When I hear dairy farmers say they are not interested in quality and are indifferent to giving their milk proper care, I am led to say to these men, "You are working against your own interests because the science of dairying has not developed to a point where poor raw material can be transformed into fine quality dairy products. Science has not yet discovered how to make bad flavored milk and cream delectable."

In the city of Bagdad lived Haykem, the wise one, and many people went to him for counsel, which he gave freely to all, asking nothing in return. There came to him a young man who had spent much but got little. He said, "Tell me, wise one, what I shall do to receive the most for that which I spend?" Haykem answered, "A thing that is bought or sold has no value unless it contains that which can not be bought or sold. Look for the priceless ingredient." "But what is this priceless ingredient?" asked the young man. Spoke then the wise one, "My son, the priceless ingredient of every product in the market place is the honor and integrity of him who makes it and markets it. Consider his name before you buy."

We must put in our dairy products that which can not be bought or sold. We must put honor in our work, which will not only increase the consumption of dairy products, but will bring better prices for quality products. I could cite many instances of increased consumption of butter and cheese when the consumer has been able to purchase quality products.

The Interstate Milk Producers' Association and your Dairy Council have comprehended the necessity of quality and have established a program for improving the milk supply of your cities that is commendable. One of the great values of farm marketing organization is that it places the producers in contact with the consumer and gives them an understanding of what he demands. Let me urge that this work of your two outstanding institutions be extended to all parts of your state.

PRODUCERS MUST WORK TOGETHER

Another step in helping to solve the dairymen's problem is co-operation. There is large opportunity to develop more co-

operative enterprises. It is not my desire to have all dairy products handled co-operatively, and neither do I think it is for the best development of our dairy industry that all products should be handled by corporations. We need for its best development efficient co-operative and corporate enterprises engaged in handling the dairy farmer's milk. It is my desire to see cooperation better developed because I look upon it as not only an agency in helping to secure a larger return for the farmer's product, but something of tremendous importance to the welfare of the nation. If farmers have opportunity to experience the reflex action of the market to know that they are getting all they can for their products, it will make for the contentment and stability of those engaged in agricultural pursuits. It is important that producers know they are getting a square deal. It has been unfortunate for the co-operative movement that some engaged in it have advocated that through the development of co-operative enterprises, prices could be fixed. Nothing is more ridiculous. In places where it has been tried, it has proven to be expensive and has been the means of destroying several promising co-operative marketing companies.

THE FUNCTION OF GOVERNMENT

I am aware that there are those who believe the government can assist agriculture to return to normalcy. I have never taken seriously the promises of certain politicians or the suggestions made by those who are looking for outside agencies to help solve their problems. It is my belief that those of us within the industry must work out its problems and bring such changes as to make our industry remunerative. We need, of course, a strong, honest government and laws to permit the farmer to carry on his business upon a proper basis. It seems to me it is the function of the government to make the rules for the game we are playing and to enforce them so that we all play fair. But it should be the privilege of the people to play the game without the assistance of the government. In times of emergency it is fitting for the government to render assistance, but I am more concerned that the government interest itself in the enforcement of rules—laws, if you please—so that each group of industries will have equal opportunity.

PROVEN SIRES

The cow testing association not only locates the good and the poor cows but will also locate the good bull. We have not made use of this part of the cow testing association until recently. Last year over 1000 bulls in cow testing associations became proven sires; that is, sires capable of producing daughters with

high records. When inquiry was made concerning them, over 800 had been sold to the butcher. We must get a keener understanding of the value of the proven sire. The profit between the bull that will sire animals capable of producing 250 to 350 pounds compared to animals that will produce 350 to 450 pounds of fat is tremendous. Of course, the young, unproven bull can not be ignored for he must be used before he can be proven and old, proven sires pass away. The breeder, however, who desires to make substantial progress in the development of his herd should use the young bull rather lightly until he has shown himself to be a good breeder. I am fully cognizant of the prejudice against the mature bull which is more or less unruly and difficult to handle. We must submerge our prejudice and lay plans to handle old bulls if we expect to establish breeding upon the proper basis.

On a recent visit to the Bureau of Dairy Industry I discovered they had records of bulls that had advanced production of herds and of bulls that had lowered production. Here are the results of two of them. A pure-bred bull was bred to dams that produced on the average 7,890 lbs. of milk containing 425 lbs. fat in a year. The daughters of this bull averaged 5,451 lbs. milk containing 315 lbs. fat. The daughters produced 2,439 pounds of milk less and 110 lbs. of fat less than their dams. Another pure-bred bull was bred to dams that averaged 8,521 lbs. milk containing 489 lbs. fat in a year and the daughters of this bull averaged 13,486 lbs. milk containing 675 lbs. fat. This bull increased the production per cow 4,965 lbs. milk and 186 lbs. fat. Doesn't this indicate the necessity of proving a sire before he is extensively used. Of course, consideration should be given to type as I do not believe it is necessary, when procuring high producing animals, to disregard beauty of form. The true breeder will secure both good type and good producing animals.

THE POT OF GOLD

There is an old German folklore saying: "The pot of gold is buried at the end of the rainbow." It is another way of saying that opportunity is hundreds of thousands of miles away, while in reality it is right where you are. There is a bow resting on every farm in Pennsylvania. The pot of gold is buried at the end. If the dairy cow is accepted as a prominent part in the agriculture of this section, this gold will be found. Your agriculture will be permanent and the people prosperous.

ADDRESS

HON. CHARLES G. JORDAN, *Secretary of Agriculture*
Commonwealth of Pennsylvania

It is a pleasure to accept the invitation of The Pennsylvania Dairymen's Association to be present at your annual banquet this evening.

I appreciate the importance of dairying among the agricultural enterprises of the State. According to the 1925 census there are in Pennsylvania 200,443 farms of which approximately 84 per cent or 168,216 farms are keeping dairy cows. The data compiled by the Bureau of Statistics in the Department of Agriculture show that these cows produced milk having a farm value of $97,815,069.60 in 1925. Dairying without doubt is the largest single agricultural enterprise in the State and I congratulate you upon the importance of the vocation in which you are engaged.

Not only is Pennsylvania a great dairy state but it also ranks high in other agricultural activities. In 1926 it stood second among all the states in the Union in buckwheat production, fourth for apples, fifth for grapes, sixth for potatoes, seventh for hay, rye, and tobacco, eight for wheat, twelfth for oats and fifteenth for corn.

Since the number of dairy cows in the state exceeds the combined numbers of beef cows, steers, ewes, and horses it is evident that the dairy cow will prove the vehicle through which is marketed in the form of milk, a considerable percentage of the hay, corn, oats and other farm crops of the state. This is no small job for the dairy cows of Pennsylvania since in 1926 the State produced 3,829,000 tons of hay, 57,154,000 bushels of corn, 35,552,000 bushels of oats, 23,400,000 bushels of wheat, 1,488,000 bushels of rye, 400,000 bushels of barley and 3,610,000 bushels of buckwheat.

It is worthy of note that Pennsylvania ranks high in the average yields of farm crops per acre; for instance the yield of corn per acre for the country is 26.6 bushels, while that of Pennsylvania is forty-one bushels per acre.

Since I have been Secretary of Agriculture less than forty-eight hours I have not yet had an opportunity to study the

agricultural situation sufficiently to map out an agricultural program for the coming administration. I should like to speak of a few things, however, that I consider of much importance to the agricultural welfare of the State:

The eradication of bovine tuberculosis should be pushed with all possible diligence and with all the means available. Your Association today passed a resolution urging that the Pennsylvania State Legislature "make adequate appropriation necessary to care for the estimated needs for such indemnification for the next two years as has been outlined by the State Department of Agriculture." The amount requested for indemnity is $2,834,650.00. The amount for carrying on the work $1,350,000.00 and the residue of the dog tax money. I trust this measure may have your earnest support when it comes before the Legislature. Seven counties have already been freed from bovine tuberculosis to such an extent that less than one-half of one per cent exists. These modified counties are Mercer, Crawford, Jefferson, Cameron, McKean, Butler and Clearfield. Complete county tests have been made in four other counties which are not yet modified. Lawrence, Indiana, Union and Potter.

One city after another is putting up the bars against milk from untested herds. May I venture the statement that in ten years' time no dairyman will be able to sell a single quart of milk in the United States from an untested herd.

Cooperative marketing of agricultural products should be fostered. Already the state has an enviable reputation for cooperative marketing organizations. This is particularly true of the dairy situation. The large cooperative milk producers' associations—The Interstate, The Dairymen's League and The Dairymen's Cooperative Sales Company are doing an excellent work for their members. The potato growers, the fruit growers and the poultry producers have also made considerable headway toward the cooperative marketing of their products. We hope to develop still further the cooperative marketing of agricultural products during the coming administration.

Agriculture is such a big field and there are so many problems connected with it that there is a great need for more knowledge on a multitude of agricultural subjects. The instructional and research work along agricultural lines is carried on by The Pennsylvania State College and we hope to cooperate in every way with that Institution, so that it may function to its fullest capacity in research and instructional work. It is a crying shame in a great state like Pennsylvania that facilities are

not provided at its State Agricultural College, so that all properly qualified applicants can be admitted. I understand that each year hundreds of boys and girls have to be denied admission because of lack of room.

Finally, The Department of Agriculture has as its chief duty the enforcement of the laws relating to Agriculture. These laws for the protection of the public health and the agricultural industry make a large sized volume. Several of these laws relate particularly to the dairy industry. For instance one Act provides that only licensed testers may conduct the Babcock test for the determination of the percentage of fat in milk and cream, where the basis of payment is made on such tests. To become a licensed tester an applicant must first undergo an examination to determine his fitness for such work. This Act has worked very beneficially to the dairymen of the State. The Department of Agriculture employs men to visit the dairy plants from time to time and check up the fat tests made at the plant.

The present administration will use every effort to enforce all the laws for the protection of the great agricultural industry of the State of Pennsylvania and we trust it will have the hearty cooperation and support of the men who grow the crops and handle the livestock of the State.

PRESENTATION OF AWARDS TO CO-OPERATIVE BULL ASSOCIATIONS DOING THE MOST OUTSTANDING WORK IN 1926

S. J. Brownell, *Dairy Extension Specialist*, State College, Pennsylvania

I have been requested by the representatives of the different organizations presenting trophies for bull association work to award all the trophies and thus save time.

I wish to call on those members who are present from the Montgomery County Bull Association to arise in order that the meeting will know who receives the trophies. These men, Mr. H. D. Allebach, Mr. William Landis, and Mr. Charles E. Wismer are here representing the Montgomery County Holstein Bull Associattion which has been chosen as the most satisfactorily conducted bull association in Pennsylvania.

The Holstein-Friesian Association of America as represented by Mr. Allen N. Crissey who sits on my right is presenting this true type statuette of a Holstein cow to this bull association in appreciation of their splendid accomplishment in promoting the Holstein breed.

To Mr. Charles E. Wismer, Secretary of this association to whom a great deal of the success of the organization is due the Holstein Association of America presents this gold medal as a token of appreciation for his outstanding work along bull association lines. Mr. Wismer was chosen as the Holstein breeder who has done the most for Holstein bull association work in the state.

These members present have all shown very creditable results through the use of the bull association sires. Mr. H. D. Allebach has doubled the production of his herd through the daughters of these bull association bulls, as shown by cow testing association records. Mr. William Landis who is also present has shown a very creditable increase. The daughters of bull association bulls in his herd are averaging close to 500 pounds of butterfat in the Montgomery County Cow Testing Association.

These associations have all been scored according to the following standard and the winners selected from the highest score.

BULL ASSOCIATION SCORE CARD

To be used in improving and comparing Bull Associations in Pennsylvania.

		Perfect	Awarded
1.	Care and housing of the Bull	300	
2.	Records of the members	300	
3.	Secretary-Treasurer's records	200	
4.	Bull Keeper's records	100	
5.	Supervision of the Directors	75	
6.	Supervision of the County Agent	25	
	Total Score	1000	

Since there are no representatives present from the First Butler County Jersey Bull Association, I wish to call your attention to the statuette of "Sociable Sybil" which is presented by the American Jersey Cattle Club to the Jersey Bull Association in the state which has been most satisfactorily conducted during the past year according to the previously mentioned score. This statuette is presented to the First Butler County Jersey Bull Association located at Harrisville, Pennsylvania.

The bronze medal is presented to Mr. James Guest of Butler, Pennsylvania, by the Holstein-Friesian Association of America for his work in promoting Holstein bull association in his county.

A large loving cup was presented by the Purina Mills manufacturers of dairy feeds to the bull associations in Pennsylvania, regardlees of breed, that has been most satisfactorily conducted during the past year. This cup has been won by the Montgomery County Holstein Bull Association and will become the permanent property of the association which wins it two years in succession.

Pennsylvania has more bull associations than any other state in the United States and with one exception more than any two cities in United States. I wish to congratulate the winners of these trophies for their outstanding accomplishments under such close competition. I feel certain that they have accomplished a great deal of good for the dairy industry and have advanced very materially the breed they represent.

AWARDS TO HIGH PRODUCING HERDS IN COW TESTING ASSOCIATIONS

C. R. GEARHEART, *Dairy Husbandry Extension*, State College, Pa.

It is now my privilege to call your attention particularly to the owners of herds that have won special distinction during 1926.

The Pennsylvania Dairymen's Association recognizes the 300-pound herd average as an exceptional accomplishment and are offering a suitably engraved ribbon to each herd, grade or pure-bred, that made an average production of more than 300 pounds of butterfat during the year 1926. Tonight we are glad to announce that there are 377 of these herd owners. During 1925 there were 301 such herds and in 1920 there were only 94.

This year the Potter County Association will receive 10 ribbons, while last year it received only three.

Lycoming county will be presented with 11 ribbons this year, while last year it received only one.

Practically every member in the Cumberland Association will this year receive a ribbon.

In a herd with an average production of 300 pounds or more of butterfat per cow you will find a great deal of personality. You will find there some one interested in the cows, seeing that they have comfortable quarters with clean bedding, plenty of good clean water and a liberal ration of good feed.

The low producing cows will have been weeded out and replaced with better ones, probably heifers from the best cows in the herd. If you wish to see the result of years of careful, painstaking dairy work and visions of our grandfathers being realized, I would suggest that you visit our 300-pound herds.

I feel that it is only just and proper that these herds receive special recognition and it gives me a great deal of pleasure to present, in behalf of the Pennsylvania Dairymen's Association, a red ribbon to all cow testing association members with herds of at least five cows that average between 300 and 350 pounds butterfat, a blue ribbon to all those with averages between 350 and 400 pounds butterfat, and a purple ribbon to all members

with averages exceeding 400 pounds butterfat. In addition to these ribbon awards, The Pennsylvania Federation of Holstein-Friesian Clubs, in recognition of the great economic importance of a high average milk and butterfat production per cow, has awarded a large loving cup to the Holstein herd making the highest average production for the year. It gives me a great deal of pleasure to present, in behalf of the Holstein Federation of Pennsylvania, this cup to William Steigerwalt, a member of the Carbon County Cow Testing Association. Mr. Steigerwalt has a herd of thirteen cows, all registered Holsteins, which he milked three times daily and which averaged 14,443 pounds milk and 509.6 pounds butterfat. The Pennsylvania Federation of Holstein-Friesian Clubs will present another large loving cup for the highest Holstein average in 1927.

In closing, I wish to mention one other herd in the Carbon County Association, that of L. A. Zimmerman, a herd of 17 registered Holsteins with an average this year of 15,056 pounds milk and 482.9 pounds fat. This is the highest milk average for 1926. This average was made on three time milking and is the highest ever attained in Pennsylvania.

A LIST
OF
COW TESTING ASSOCIATION MEMBERS
WITH
Herds Averaging Five or More Cows, Which Exceeded the Goal of 300 Pounds of Butterfat Average During 1926

Herds Averaging 300 to 350 Pounds

Owner	Address	Av. No. Cows	Breed	Milk Lbs.	Fat Lbs.	County
H. C. McEwen	Mercer, R. D.	13.33	GJ	6034	300.0	Mercer
Howard G. Mahle	Miola	6.25	GG	6048	300.0	Clarion
Frank J. Murphy	New Albany	15.33	GH:RH:GG	8386	300.0	Bradford
Lloyd D. Linn	Washington, No. 9	10.67	RH	8706	300.0	Washington
Furman Gyger	Kimberton	31.25	PBH	8571	300.0	Chester
Jonas Mulford	Ulysses	15.17	R:GJ:GH:A	6277	300.3	Potter
H. J. Gregory	St. Marys	20.75	R:G:HG:G:GJ	8119	300.4	Elk
S. J. Diehl	Bedford, R. D. 4	5.00	R:Gr:J	5876	300.6	Bedford
A. W. Mawhinney	Cannonsburg, No. 3	10.58	RH	9937	300.8	Washington
W. G. Rimer	Rimersburg, R. D.	18.58	R:GH:GG	7516	301.1	Clarion
Walter S. Bishop	Doylestown	9.67	R:GA	7286	301.3	Bucks
Cook & Bennetch	Langhorne	32.67	R:GH	9345	301.9	Bucks
W. E. S. Uber	Sandy Lake	5.67	GG	5348	302.1	Mercer
Hugh Gilkey	West Middlesex	11.92	GG:GJ	6973	302.3	Mercer
Frank Beck	Liberty	8.92	GG:GJ:GH	7592	302.3	Lycoming
W. E. McMeen	Port Royal	13.08	RH	9298	302.3	Juniata
J. E. Hindman	Tyrone	12.33	RH	6313	302.7	Huntingdon
W. E. Patton	Westfield	16.92	R:GH	8287	302.8	Tioga
Black Bros.	Millerstown	7.00	R:GH	9136	303.0	Perry
A. S. Graybill	Elverson	8.25	G	6809	303.2	Chester
Dorsey Whitehead	c/o Co. Agt. Towanda	10.42	GH	7209	303.3	Bradford
Isaac Yocom	Douglassville, R. D.	13.33		7434	303.3	Berks
Tresslers O. Home	New Bloomfield	31.50	R:GH	8609	303.4	Perry
E. A. Sturgin	Stoneboro	11.83	R:GH	7952	303.5	Mercer
G. V. Rowland	Fredonia	8.75	RJ	5405	303.6	Mercer
G. H. Lewis	Cambridge Springs	8.42		7951	303.6	Crawford
C. J. Koller	Solebury	19.25	RH	9198	303.6	Bucks
B. C. Adams	Colley	7.08	GG	5347	303.9	Sullivan
W. B. Bennett	Ulysses	20.67	R:GH	8636	304.1	Potter
Dreamwood Farm	Coraopolis	6.83	RH	9304	304.4	Alleghany

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Ed. Quigley	West Chester, R. D.	23.75	GH	9094	305.2	Chester
Dellas Stalhman	New Bethlehem, Star Route	11.92	R:GG	6087	305.3	Clarion
Rudy J. Yoder	Belleville	20.08	R:GH	8655	305.8	Mifflin
H. E. Small	Clarks Mills	12.42	GH:GJ	7295	305.9	Mercer
P. J. Cox	Warriors Mark	12.17	R:GG	5482	306.1	Huntingdon
Harold Holcomb	Coudersport	14.50	R:GA	7334	306.1	Potter
Joseph Baker	Arthurs	5.00	RH	8737	306.3	Clarion
C. W. Millspaw	Edinboro	15.08	Holstein	8389	306.4	Erie
N. J. Leete & Son	Coudersport	24.42	R:GH	8655	306.5	Potter
L. D. Weary	Carlisle, R. 5	9.50	R:GH	9138	307.1	Cumberland
S. B. Wasson	State College	19.67	R:GG	6677	307.2	Centre
Norris Matthews	Pottstown	12.42	GH	8072	307.5	Chester
C. A. Gamble	Fredonia	10.00	R:GH	9157	307.5	Mercer
George S. Havens	New Hope	11.00	R:GG	6175	307.8	Bucks
County Farm	Girard	24.83	Holstein	8163	307.8	Erie
C. D. Frey	Lehighton, R. 1	18.33	R:GH	9002	307.9	Carbon
Jonas Eberts	Andreas	24.50	R:GH	9239	307.9	Carbon
Wood Bixler	Canton	7.08	GH	7609	308.1	Bradford
T. K. Wise	Thompsontown	11.67	R:GH	8950	308.2	Juniata
D. E. Tracey	Milan	14.92	RJ	5462	308.6	Bradford
John C. Fleming	Belleville	10.00	R:GH	9290	308.9	Mifflin
F. W. Swartz	Spruce Hill	8.25	R:GH	9540	309.1	Juniata
J. I. Smith	New Hope	20.17	R:GH	6331	309.4	Bucks
J. H. Seanor	N. Alexandria	14.75	RH:GJ	9584	309.9	Westmoreland
O. I. Martin	Cambridge Springs	17.92		8577	310.0	Crawford
W. W. Mitchell	Newport	10.58	G:GJ	7815	310.2	Perry
O. H. Culbertson	Knox	17.12	R:GG	6503	310.3	Clarion
C. E. Buchanan	Hickory No. 1	8.50	RH	10083	310.3	Washington
H. S. Mathias & Son	Irwin, R. D. 3	24.00	RH:GG:GJ	8317	310.4	Westmoreland
Clark Patterson & Son	Eighty-Four, No. 1	14.83	R:GH	8992	310.4	Washington
J. M. Marquis	Hickory, No. 1	11.83	RH:GG	8044	310.6	Washington
R. H. Fleming	Alba	14.50	RH	8681	310.8	Bradford
Carl Norbeck	Sugar Grove	19.50	R:GH	8716	310.9	Warren
John Hosbach & Son	Erie, R. D. 1	28.42	Holstein	8878	311.2	Erie
N. H. Yoder	Spruce Hill	8.25	RH	9691	311.5	Juniata

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
L. L. Thornton	Wattsburg	15.17	Mixed	8176	311.6	Erie
Clayton Gingrich	Hershey	12.92	GH	9265	312.4	Dauphin
W. J. Hoover	Patton	5.33	GG	5497	312.5	Cambria
Geo. Shepard	Canton	12.18	RH	8951	312.5	Bradford
The Manus Bros.	Towanda, R. D.	27.08	GJ	5955	312.9	Bradford
R. H. Page	Paoli	17.17	GG:GH:GJ	6579	313.0	Chester
S. W. Zook	Belleville	8.50	G:GH:GH	7233	313.0	Mifflin
W. J. Yerkes	Columbia Cross Roads	10.92	RH	9202	313.1	Bradford
J. S. Briggs	Yardley	13.33	R:GG	7086	313.3	Bucks
C. S. Kriebel	Doylestown	9.42	R:GA	8138	313.4	Bucks
J. F. Townsend & Son	Avonmore	12.25	RH:GG	9425	313.4	Westmoreland
W. H. George	New Bethlehem, R. D.	6.00	GG:GJ	6379	313.6	Clarion
D. H. Nichols	Trauger	15.25	R:GH:GJ:Mixed	8179	313.7	Westmoreland
C. E. Young	Williamsport	15.17	R:GH	9332	313.7	Lycoming
E. P. Allinson	West Chester	28.58	R:GH	9082	314.0	Chester
J. E. Adamson	Rea	21.33	R:GH	9572	314.1	Washington
L. A. Michael	Conneaut Lake	14.00	GD:GJ	7357	314.5	Crawford
S. W. Zeigler	Mechanicsburg, R. 6	10.50	R:GH	9079	315.0	Cumberland
P. J. Stein	Muncy	13.92	R:GH	9360	315.0	Lycoming
K. P. Allshouse	Brookville, R. D.	8.00	RA:GJ:GG:GH	6967	315.1	Jefferson
A. A. Feightner	Carrolltown	9.08	RG:PJ	5654	315 5	Cambria
N. L. Reed	Titusville, R. 2	9.50	GJ	6030	315.6	Crawford
V. H. Van Ness	Columbia Cross Roads	10.67	R:GH	8501	316.0	Bradford
Fred Shaffer	Forksville	13.75	GBS:GH	7204	316.4	Sullivan
G. D. Barnes	Grove City	9.42	RH	8129	316.5	Mercer
C. G. Niesley	Mechanicsburg, R. 1	16.00	R:GH:GG	8583	316.8	Cumberland
F. B. Sellers, Jr.	Carlisle	8.17	GH:GG	7701	317.5	Cumberland
Geo. R. Shaull	Mechanicsburg, R. 5	15.33	R:GH	8721	317.9	Cumberland
St. Vincent's Archabby	Beatty	25.25	R:GH	9352	317.9	Westmoreland
Dr. G. W. Ely	Bridgeville, R. D. 3	9.75	RH	9207	317.9	Allegheny
Graham & Marsteller	Franklin, R. D.	15.50	R:GJ:GH:GJ	8074	318.0	Venango
Jacob P. Yoder	Belleville	5.83	R:GH	8704	318.0	Mifflin
Arthur Bullers	Brookville, R. D.	7.50	RG	6148	318.1	Jefferson
C. S. & F. M. Chaffee	Ulster, R. D.	21.08	RH	8583	318.4	Bradford
Orville Rumbaugh	Millerstown	13.17	R:GH	9472	318.5	Perry

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Harvey Murphy	Norristown, R. 5	14.08	R:GH	9211	318.6	Montgomery
Howard Hested	New Albany	6.08	RH:GH	8623	318.7	Bradford
Mrs. Matilda Karlheim	Patton	14.42	R:G:GH	6639	319.1	Cambria
C. L. Risher	East Brady	10.25	R:GH:R:GG	8394	319.8	Clarion
Fred J. Bohlayer	Canton	11.67	RH	7893	319.9	Bradford
Horace Andrus & Son	Columbia Cross Roads	15.92	R:GH	8068	320.1	Bradford
R. F. Smith	Roaring Branch	10.08	GH:GJ:GS	6903	320.7	Tioga
Ira Cutchall	Cochranton, R. D.	6.92	G:GH	7097	320.7	Crawford
Beck and Beck	Liberty	14.17	RH:GJ:GG:GH	8462	320.7	Lycoming
J. Taylor and Son	Cogan House	14.67	R:GH	8462	320.7	Lycoming
Rynd Farm	Oil City	36.67	RH:GG	7729	320.8	Venango
Warren G. Schultz	East Greenville	15.25	R:GH	9039	320.8	Montgomery
J W. Martin & Sons	Bessemer	24.08	RJ	5923	320.9	Lawrence
Elwood Williams	Rainsburg	23.50	Gr:J	5843	321.8	Bedford
W. H. Fleming	Limestone	7.67	R:GG	6700	321.8	Clarion
William Dibble	New Albany	9.00	RH	9203	321.9	Bradford
A. C. Hartle	Bellefonte	14.92	RH	9633	321.9	Centre
Howard Baxter	Granville Summitt	9.33	RS	7867	322.1	Bradford
Wm. Lloyd	Downingtown	22.92	Jersey	6298	322.3	Chester
B. R. Byler	Allensville	8.25	R:GH	8645	322.3	Huntingdon
E. D. Wetmore	North Warren	45.17	GG:H	8767	322.3	Warren
Frank V. Rohe	Dushore	8.92	RH:GH	10283	322.4	Sullivan
W. W. McMillen & Son	Wampum	15.50	RH	9380	322.5	Lawrence
Miss Anne McCormick	Harrisburg	10.75	R:GG	6933	322.7	Cumberland
G. J. Phillips & Guy Neff	Alexandria	32.00	GG:R:GH	8809	323.2	Huntingdon
Chas. Luellen	Edinboro	29.58	R:GH	8342	323.3	Crawford
O. M. Woodward	Pennsburg	10.17	R:G:SH	7854	323.5	Montgomery
Wm. Rupp	Breinigsville, R. D. 2	10.67	RH	9863	323.9	Lehigh
Miss L. T. Morris	Chestnut Hill	14.17	RJ	5752	324 2	Montgomery
V. E. Ashbaugh	Emlenton, R. D.	10.67	R:GG	6484	324.5	Clarion
H. B. McCormick	Harrisburg	7.00	R:GG	6875	324.5	Cumberland
Glass Brothers	Bulger, R. D. 1	24.58	RH	9220	324.5	Alleghan/
Masonic Brothers	Elizabethtown	85.33	RA	8478	324.6	Lancaster
A. N. McClinton	Coraopolis, R. D. 2	12.00	R:GH:GJ	8701	324.6	Alleghany
R. L. Schaeffer	Fogelsville	21.67	HG:J	8786	324.6	Lehigh

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
E. E. Rieck	New Bloomfield	19.75	R:GH	9906	324.9	Perry
Warren Dearborn	Meadville	9.33	RH	10180	324.9	Crawford
Clinton Stainbrook	Cambridge Springs	6.00	RS	6972	325.0	Crawford
J. W. M. Gruber	Shippenville, R. D.	13.92	GG	7062	325.1	Clarion
R. G. Williams	Canton	11.75	RH	9079	325.1	Bradford
Samuel Cessna	Bedford, R. D. 4	12.33	R:Gr:H:Gr:J	8719	325.3	Bedford
Mercer Sanitarium	Mercer	16.67	R:GJ:GG	6603	325.7	Mercer
Oscar Ault	Lutzville, R. D. 1	13.50	Gr:H:Gr:J	6794	325.7	Bedford
G. S. Henry & Son	Wesleyville	12.08	Holstein	9015	325.8	Erie
J. M. Faner	Waterford	27.58	Holstein	9273	325.9	Erie
A. D. Philson	Mercer	9.58	GJ	6364	326.0	Mercer
H. G. Wright	Canton	12.58	RG	6370	326.3	Bradford
E. E. Beale	Port Royal	10.83	GH	9239	326.4	Juniata
J. O. Harding	Brookville, R. 5	5.67	R:GG	6088	326.5	Jefferson
H. K. Lesher	Cedars	15.75	GH	9429	326.7	Montgomery
Walter McCafee	Glen Moore, R. D.	18.25	GH	8782	326.8	Chester
J. Ard Cowden	McDonald, 4	18.33	RH	9624	327.1	Washington
Merle Ongley	Centerville, R. 4	9.83	RH	10364	327.2	Crawford
John Hayes	Hublersburg	16.00	GH	8022	327.4	Centre
W. D. Snyder	Heburnville	15.96	RH:GG	9557	327.5	Lycoming
Giles Thomas	Westfield, R. D.	16.00	RH	9201	327.7	Tioga
Harry Kraft	Newport	6.42	R:GG	6576	327.8	Perry
H. B. Edeburn	Mercer	8.58	RG	6879	328.3	Mercer
L. R. Cox	Pulaski	8.67	GH:GG:GJ	8511	328.4	Mercer
Joe C. Hummer	Titusville, R. 2	16.00	RG	6485	328.9	Crawford
Howard Cummings	Millersburg	7.58	GH:GG	8972	330.0	Dauphin
Paul N. Lehman	Carlisle, Box 293	9.83	R:GH:GG	8972	330.0	Cumberland
W. B. Rhoades	Oakbourne	28.17	GH	9196	330.3	Chester
J. B. Meizel	Boiling Springs	5.33	RH	10386	330.4	Cumberland
T. J. Wilxon	Midway	16.00	R:GH:GG	9584	330.6	Alleghany
Stanley Slange	Greenville	19.55	GH:GS:GJ	7586	330.8	Mercer
Burl Hayes	Edinboro	12.33	Holstein	9316	331.0	Crawford
H. F. Freed	Racine	6.00	RH	10070	331.0	Beaver
Harry Lent	Coudersport	10.83	R:GH	8649	331.3	Potter
James Nicholson	Muncy	10.92	R:GH	8962	331.3	Lycoming

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Harry Waltman	Muncy	15.33	R:GH	9820	331.4	Lycoming
Ross A. Cory	Conneautville	15.00	RH:GH	8586	331.6	Crawford
Bailey Walker	Sandy Lake	8.75	GG	8336	332.3	Mercer
J. A. Young	c/o Pro. D. Co., Williamsport	14.67	R:GH	9394	332.6	Lycoming
J. S. Bernheisel	Loysville	9.75	R:GH	9570	332.6	Perry
Curtis Baumunk	Forksville	13.17	GH:GG:GJ	8159	332.7	Sullivan
A. P. Irwin	Chadds Ford	29.00	RG	6901	332.8	Chester
Mack Van Wegen	Coudersport	5.00	GA	8446	332.7	Potter
Mayes & Confer	Howard	16.00	RH	6661	332.9	Centre
Lee Van Dusen	Cowanesque	8.50	R:GH	9210	333.0	Tioga
W. A. Baird	Cambridge Springs	27.17	R:GJ	5940	333.2	Crawford
W. H. McCullough	New Galilee	11.00	R:Gr:H	8630	333.6	Lawrence
Albert Hasbrouch	Titusville, R. 2	10.83	GH	8935	333.9	Crawford
H. C. Herbol	Fairview	9.08	Mixed	8064	334.2	Erie
Wm. E. Tubach	Dushore	12.00	RH:GH	9425	334.4	Sullivan
Bruce Dodge	Lawton	14.50	R:GJ	6571	334.6	Susquehanna
Geo. Gehman	Coopersburg	11.58	GG:H	9228	334.6	Lehigh
R. E. Bollenbacker	Greenville	13.50	GH:GS:GJ	8377	334.9	Mercer
Pew Estate	Mercer	13.08	R:GG	6829	335 8	Mercer
U. K. Peachey	Belleville	8.58	R:GH	9400	336.0	Mifflin
Geo. Wilson	Boiling Springs, R. D.	9.92	R:GH	10326	336.3	Cumberland
J. H. Silvis & Sons	Greensburg	74.67	R:GH:R:G	8823	336.8	Westmoreland
M. S. Taylor	Cogan House	7.75	GH	8952	336.8	Lycoming
J. U. Morgan	Wheelerville	11.75	GH:GBS:RH	8651	336.9	Sullivan
C. E. Marshall	West Chester	21.92	RH	9055	336.9	Chester
Cleon Buck	Ulysses	10.42	R:GH	10400	337.0	Potter
Clarence Snyder	Muncy	8.25	R:GH	9241	337.7	Lycoming
Howard W. Plotts	Forksville	10.58	GG:GJ	7001	338.1	Sullivan
S. D. Warriner	Montrose, R. D.	14.42	RA	7571	338.3	Susquehanna
S. C. Beeman	Brookville, R. D.	12.75	R:GG	6842	338.4	Jefferson
John W. Raudabaugh	Carlisle, R. 7	21.50	R:GH	10067	338.4	Cumberland
Lloyd H. Diehl	Lutzville, R. D. 1	15.00	R:Gr:J	6741	338.9	Bedford
C. A. Fox	Pocopson	18.58	RJ	6924	339.3	Chester
Geo. L. Snyder	Carlisle, R. 6	6.50	RH	9596	339.3	Cumberland
Lewis Satterthwaite	Newtown	19.75	R:GH	9737	339.5	Bucks

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Bell Brothers	Imperial, R. D. 1	16.25	RH	9618	339.6	Allegheny
H. N. Bernheisel	Greenpark	9.08	R:GH	9846	339.8	Perry
J. M. Chittster	Brookville, R. D.	10.00	GG:GH:GJ	7702	340.6	Jefferson
McClelland Bros.	Canonsburg	20.42	RH	11626	340.6	Washington
Jas. Speirs	Downingtown	17.08	RJ	6652	340.8	Chester
Pennhurst State School	Pennhurst	113.67	Holstein	9618	341.0	Chester
Linfred Benner	Langhorne	8.67	R:GH:GG	8473	341 3	Bucks
Corlis Buck	Ulysses	11.33	R:GH	9758	341.4	Potter
Porter Farms	Phoenixville	28.50		6743	342.0	Chester
Sloan & Cobb	Towanda, R. D.	70.08	R:GH:R:GJ	8859	342.0	Bradford
H. I. Gray	Honey Grove	15.42	R:GH	9786	342.0	Juniata
H. A. Snyder	Montoursville	17.17	R:GH	9652	342.1	Lycoming
Marshall Bros.	Roaring Branch	12.75	GJ:GS:GG	8428	342.2	Lycoming
Litzelman Bros.	Dushore	9.83	GH:GD	9956	342.8	Sullivan
Walter Neely	Emlenton, R. D. 2	10.82	R:GH:GG	10143	342.9	Clarion
G. E. Reed	Slippery Rock	8.75	R:GG	6986	343.0	Butler
Owen Gerhard	Palm	22.67	R:GH	9873	343.0	Berks
Aaron Erdman	Elizabethville	18.92	R:GH	10489	343.1	Dauphin
J. M. Comstock	Mercer	5.25	R:GJ	6481	343.3	Mercer
Floyd Hollenbeck	Montrose, R. D.	12.75	R:GH	9566	343.6	Susquehanna
F. B. Thompson	New Wilmington	16.58	RJ	6180	343.7	Mercer
A. K. Hummer	Titusville	22.83	R:GH	10054	344.0	Crawford
Joseph M. Conrad	Mechanicsburg, R. 5	9.00	RG:R:GH	10475	344.3	Cumberland
C. E. Mather	West Chester	16.75	RJ:GJ:H	7918	344.4	Chester
J. M. & C. A. Demon	Saltsburg	14.58	G:H	8362	344.5	Westmoreland
Theorous Kauffman	Mifflintown	15 75	R:GH	10831	344.5	Juniata
Polk State School	Polk	138.33	RH	10388	344.6	Venango
C. C. Fitch	Westford	14.33	Mixed	9692	344.8	Crawford
Arley Day	Forksville	10.25	GG	7676	345.5	Sullivan
Geo. Dayton	Birchardville	18.42	R:GJ	6235	346.8	Susquahanna
J. M. Reno	Grove City	13.75	RH	9724	346.9	Mercer
Lester McQuiston	Sandy Lake	6.50	GH:GJ	9515	347.2	Mercer
M. H. Buckley	Sandy Lake	6.67	R:GJ	5814	347.7	Mercer
M. L. Jones	Westtown	134.83	RH	10450	348.0	Chester
Ray Shook	Curllsville	6.25	R:GG	7491	348.3	Clarion
C. K. Miller	New Galilee	9.33	R:H	10403	348.5	Lawrence
D. R. Butler	Knoxville	11.00	RG	7373	348.8	Tioga
Nolan Bros.	Nittany	17.33	RH	10448	348.8	Centre
A. C. Yoder	Allensville	11.83	R:G:GH	10357	349.3	Mifflin
C. A. Mertens	Fairview	13.50	Jersey	6862	349.4	Erie
J. E. McCartney	Fredonia	12.67	R:GH:GJ	8487	349.5	Mercer

Herds Averaging 350 to 400 Pounds

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Carlisle Wooster	Leolyn	15.42	GG:H	8106	350.0	Bradford
A. F. Stroup	Palmerton, R. 2	24.50	R:GH	10291	350.0	Carbon
Peck Bros.	Nittany	8.67	RH	10361	350.3	Centre
Dr. F. E. Pringle	Punxsutawney, R. D.	10.00	RG:G:GJ	7078	351.1	Jefferson
J. W. Burket	Tyrone	11.50	GG	7253	351.6	Blair
S. C. Birchard	Birchardville	13.92	RJ	5911	351.9	Susquehanna
J. G. Kerrick	Towanda, R. D.	21.33	R:GH	9565	352.6	Bradford
C. A. Musser	Oakland Mills	9.00	GH	9587	352.8	Juniata
A. N. Lehman	Carlisle, R. D. 2	10.92	R:GH	10052	353.0	Cumberland
Fred Lester	c/o Co. Agt. Meadville	15.17	RSH	10839	353.1	Crawford
John Preston	Grover	9.92	GJ	8123	353.3	Bradford
H. E. Cleland	Imperial, R. D. 1	15.92	R:GH:R:GH	8342	353.4	Washington
Allen Jayne	Meshoppen, R. D.	16.83	R:GJ	9916	353.4	Susquehanna
Red Gate Farm	Sewickley, R. D. 1	5.58	RG	7803	353.5	Alleghany
T. C. Kryder	Mill Hall	15.75	RH	10843	353 5	Clinton
A. F. Hartman	New Bethlehem	5.92	R:GG	6980	353.6	Clarion
Bellwood Farm, Inc.	Bellevue, R. D. 7	30.67	R:GG	7821	353.6	Alleghany
John F. Nace	McAlisterville	6.50	R:GH	10077	354.0	Juniata
John Moffat	N. Alexandria	11.25	R:GG:GH	8258	354.1	Westmoreland
H. C. Drissel	Saegertown	6.75	RJ	7211	354.9	Crawford
R. J. Adist	Conneaut Lake	7.67	RJ	7046	355.3	Crawford
W. H. Price	Williamsport	12.50	R:GH:GG	9870	355.4	Lycoming
H. K. Stephens	New Port	8.42	R:GH	10044	355.7	Perry
W. G. Montgomery	Grove City, R. D. 16	10.08	RH	10044	355.7	Mercer
E. H. Mack	Wesleyville	18.42	Mixed	8974	356.5	Erie

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Blackburn Farm	Sewickley	13.08	RA	9441	357.1	Alleghany
F. N. Fowler	Rimersburg, R. D.	6.83	R:GH:GJ	8947	357.3	Clarion
J. W. Hartman	Sligo	9.00	R:GG	6880	357.4	Clarion
Hugh Fergus	Slippery Rock	25.33	GJ:GG:GH:RG	7432	358.1	Butler
D. G. Grace	Grove City, R. D. 16	8.00	R:GJ	6680	358.9	Mercer
W. F. Shrum	Jeannette	16.67	R:J	7309	359.3	Westmoreland
Ed. Birchard	Montrose, R. D.	14.75	RJ	6785	359.4	Susquehanna
B. D. Hitchcock	Sugar Grove	12.58	R:GG	7139	359.4	Warren
Del. Co. Home	Lima	17.42	GH	9504	359.7	Chester
J. E. Shook	Sligo, R. D.	6.58	R:GG	8053	360.2	Clarion
E. A. McDowell	Grove City	7.42	R:GJ	6928	360.4	Mercer
R. G. McMurray	Utica	13.58	GJ:R:GG	7213	360.9	Venango
L. M. Thompson	Montrose, R. D.	27.58	RH	10666	360.9	Susquehanna
Jesse Lehman	Carlisle, R. D. 2	5.42	R:GH:GG	9752	361.2	Cumberland
F. E. McEwen	Mercer, R. D. 2	11.08	R:GJ:GG:GH	7413	362.5	Mercer
Maurice Smith & Son	Mayport, R. D.	13.08	GG	7198	363.0	Jefferson
Clair Hotchkiss	Fairview	19.33	Holsteins	10809	363.1	Erie
D. Q. Adams	Mifflintown, R. D.	13.92	R:GH	10959	363.3	Juniata
R. L. Carter	Meshoppen, R. D.	16.75	R:GJ	7411	363.7	Susquehanna
John Doan	Powell, R. D.	26.17	R:GH	9030	364.0	Bradford
G. Ralph Rohe	Dushore	10.83	RH:GH	10736	364.9	Sullivan
W. D. Koontz	Lutzville, R. D. 1	7.50	RH:Gr:J	8669	365.2	Bedford
Will Hasbrouch	Titusville, R. 2	10.00	RH	11910	365.3	Crawford
A. S. McKinney & Son	Franklin, R. D. 4	10.33	GJ:GG:GS:GH	8783	367.1	Venango
Lawrence Buck	Ulysses	17.83	RH	10671	367.6	Potter
Burton McLean	Lehighton, R. 1	13.17	R:GH	10641	370.2	Carbon
H. R. Paulhamus	Hepburnville	17.58	RH	10622	370.7	Lycoming
E. A. Booth	Parkers Landing, R. D.	6.67	GH:GG	8840	370.8	Clarion
Elmer C. Ludt	Carlisle, R. D. 5	12.02	R H	11329	371.7	Cumberland
R. A. Eisamen	Irwin, R. D. 3	18.00	R:GH:GG	9940	373.3	Westmoreland
Mrs. Rose Curtze	Erie, R. D. 8	28.55	Holstein	9862	373.5	Erie
I. P. Chaffee	Towanda, R. D.	18.58	RJ	6892	373.9	Bradford
A. K. Rothenberger	Lansdale, R. D. 1	16.92	R:GH	19877	374.4	Montgomery
C. M. Bean	Conneautville	21.17	RH	10540	374.5	Crawford
Harold Ziegler	Wescoesville	8.56	GH	11026	375.2	Lehigh

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
A. J. Yahner	Patton	9.17	P:GJ	6549	375.7	Cambria
O. A. Shirey	Linden	15.50	RH	10709	378.0	Lycoming
Herbert Cooper	Ulysses	9.00	RJ	7855	380.9	Potter
Ward C. Krape	Bellefonte	11.75	RH	10801	380.9	Centre
T. R. Auker	Mifflintown, R. D.	11.50	RH	11907	380.9	Juniata
W. E. Rickert	Greenville	7.17	GG:GJ	8387	381.6	Mercer
G. J. Martin	New Albany	6.25	RH	11081	381.7	Bradford
A. M. King	Mercer	15.17	R:GJ	7793	382.5	Mercer
Frank D. Gross	Thompsontown	9.58	RH	10106	382.5	Juniata
Robert Bamford & Son	Midway	22.83	RJ	7360	382.8	Washington
Herbert Wilcox	Canton	16.17	GG:H	8367	383.7	Bradford
Walter Rupp	Mechanicsburg, R. 4	11.42	R:GH	11011	384.3	Cumberland
J. B. Byler	Allensville	8.33	R:GH	11876	384.5	Huntingdon
Emmer Pepper	Granville Summit	12.33	R:GH	10568	384.7	Bradford
J. W. Sieber	McAlisterville	8.50	R:GH	11100	385.8	Juniata
Guy Rhoads	Emlenton, R. D. 2	7.83	GG:GJ:R:GH	9098	386.1	Clarion
N. Partch & Chas. Saeger	Linesville	7.75	GH: GJ	10658	386.1	Crawford
T. J. Chamberlain	Mundorf, R. D.	11.17	R:GJ	7089	387.1	Jefferson
F. L. McDermott	New Albany	10.00	GH	10813	387.5	Bradford
H. K. McCullough	Newville, R. D. 1	13.75	R:GG	8206	387.6	Cumberland
C. M. Worley	Mercer	8.75	RG	7373	387.7	Mercer
Miles Moose	Volant	9.00	RJ	6828	388.0	Lawrence
R. L. Carter & Son	Hickory	21.25	RH	11941	388.8	Washington
Dean Taylor	Grover	15.75	RJ	7141	389.0	Bradford
H. M. Haugh	Brookville, R. D.	5.17	RG	6643	389.5	Jefferson
Harry Forbes	Sandy Lake	16.08	R:GH	10819	390.6	Mercer
A. B. Craig	Coraopolis, R. D. 3	9.83	RH	11382	390.5	Alleghany
D. A. Morrow	Tyrone	8.33	R:GG	8012	391.6	Blair
J. W. Bronsen	New Gallilee	12.83	RJ	7210	391.9	Lawrence
F. W. Gorham	Wysox	20.83	RH	10989	392.2	Bradford
H. A. Freed	Racine	5.33	RH	11406	392.2	Lawrence
Allen Harter	Bellefonte	5.25	RH	10276	393.4	Centre
C. E. Koontz & Son	Lutzville, R. D. 1	15.67	R:Gr:J	7429	393.9	Bedford
Scanlin Bros.	Dushore	10.25	GH:RH	11637	395.5	Sullivan
Webster Griffith	Ebensburg	21.25	R:GG	8700	397.4	Cambria
J. P. C. King	Summerville, R. D.	5.00	RH	11673	398.3	Clarion

Herds Averaging 400 Pounds or More

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
H. Ockerman	Milan, R. D.	12.50	RJ	7595	401.2	Bradford
John Parkes, Jr.	Bridgeville, 3	9.42	GH	10999	401.3	Alleghany
Raymond Shughart	Carlisle, R. D. 9	6.75	R:GH	11327	402.1	Cumberland
W. A. Blumer	Fredonia	6.33	GJ:GH	8943	404.0	Mercer
C. C. Stoyer	Greenville	8.75	GG	7307	405.6	Mercer
Ardarra Herd, Inc.	Sewickley	6.67	RS:R:GH:RJ	10673	406.5	Alleghany
John S. Wohlwend	Salina	8.42	RS	10293	407.6	Westmoreland
Fairacres Farm	Sewickley	7.00	RG	8385	410.9	Alleghany
J. H. Lear	Carlisle, R. D. 5	15.75	RH	12034	411.6	Cumberland
R. H. King	Belleville	9.33	RH	12265	412.3	Mifflin
F. L. Stahlman	New Bethlehem, Star R.	6.25	R:GG	7365	413.4	Clarion
L. W. Veit	Erie, R. D. 3	16.75	Holsteins	11884	413.4	Erie
J. C. Koontz & Son	Lutzville, R. D. 1	9.58	R:GrJ	7296	414.9	Bedford
River Ridge Farm	Franklin	9.33	RJ	7633	414.9	Venango
John Porter	Sandy Lake	8.58	R:GJ	8007	418.1	Mercer
Harry Clark	Breezewood	8 25	R:GrJ:GrG:Gr:H	7873	421.0	Bedford
Ursinus College	Collegeville	12.50	RH	12462	421.4	Montgomery
C. J. Degen & Son	Mifflintown, R. D.	6.75	RH	11596	426.4	Juniata
C. D. Smith	Meadville, R. 7	9.42	RH	11440	427.9	Crawford
Allen Eshelman	Everett, No. 2	13.42	R:GrJ	8257	429.7	Bedford
C. A. McCauley	New Bethlehem, Star R.	5.67	RH	11737	431.3	Clarion
Harrington & Co.	Dushore	10.42	RH	12935	431.3	Sullivan
B. W. & J. C. Thompson	Clarion	18.58	RH	12705	431.5	Clarion
C. J. Cunningham & Son	Mifflintown, R. D.	11.67	R:GH	12484	434.9	Juniata
Farmhill Dairy	Sewickley	9.17	RG	8866	439.0	Alleghany
Wm. H. Landis	East Greenville	14.83	RH	12484	440 0	Montgomery
Ivo V. Otto	Carlisle, R. D. 6	19.33	RH	13285	443.2	Cumberland
Mrs. C. M. Schwab	Loretto	15.83	RG	8220	445 1	Cambria
J. W. Adams	Sugar Run	5.33	Holstein	13931	445.4	Bradford
J. D. Baker	Grove City	12.42	RJ	7653	452.1	Mercer

Owner	Address	Av. No. Cows	Breed	Lbs. Milk	Lbs. Fat	County
Elmer Frey	Lehighton, R. 1	23.67	R:GH	12552	465.4	Carbon
Jesse C. Kurtz	Carlisle, R. D. 8	7.92	R:GH	13929	474.4	Cumberland
Wallace Drumheller	Lehighton, R. 1	7.30	RH	14281	478.6	Carbon
L. A. Zimmerman	Lehighton, R. 1	17.00	R:GH	15056	482.9	Carbon
Wm. Steigerwalt	Lehighton, R. 5	12.83	R:GH	14443	509.6	Carbon

The above list compiled by the Extension Service of the Pennsylvania State College

FARM PRODUCTS MILK SHOW

List of winners in all classes in the dairy products exhibit at Harrisburg. The show this year was larger than last by 14 entries of milk. The total entries were 146.

MILK

Class A (from T.B. tested cows)

Thomas & Howell, Whitford	99.00	
S. H. Markey, Loisburg	98.95	
P. W. Smith, New Hope	98.70	
D. R. Hess, Lancaster	98.65	
George Wilkinson & Son, Landenberg	98.60	
Allen Eshelman, Everett	98.50	

Class B. (untested)

B. D. Carter, Christiana	97.7	(1750)
Myer Hess, Gordonville	97.7	(1800)
J. H. Longenecker, Williamsburg	97.5	
Frank Cook, Quincy	97.4	
J. F. N. Brown, Waynesboro	97.3	
F. L. Lowrey, Coatesville	97.2	

Class C (certified)

Lenker Farm Dairy, Harrisburg	99.0
Abbotts Alderney Dairy, Philadelphia	95.4

Class D (Pasteurized)

Abbotts Alderney Dairy, Philadelphia	97.1
Woodlawn Dairy, Scranton	96.8
Supplee-Wills-Jones, Philadelphia	96.5
John Shenk, Lancaster	96.3
D. R. Hess, Lancaster	95.7
J. E. Harshberger, Altoona	95.2

FARM BUTTER

J. E. May, Dover	93.50
Harry Rauch, Harrisburg	93.00
W. W. Tallman, Tower City	92.75
Ralph Hosler, Berwick	92.50
C. R. Fullerton, Burgettstown	92.00

CREAMERY BUTTER

Hershey Creamery, Harrisburg	93.0
Greenville Dairy, Greenville	92.5
State College Creamery, State College	91.5
Indiana Coop., Indiana	90.5
Goldendale Creamery, Edinburg	90.0

CONSTITUTION OF THE PENNSYLVANIA DAIRYMEN'S ASSOCIATION ADOPTED AT HARRISBURG, JANUARY 20, 1926

Article I. Name

Section 1. The name of this organization shall be the Pennsylvania Dairymen's Association.

Article II. Object

Sec. 1. The object of the Association shall be to advance the general welfare of the dairy industry, especially by promoting improved methods of producing, manufacturing, distributing and marketing milk or milk products.

Article III. Membership

Classes

Section 1. Membership shall consist of two classes (a) active, (b) honorary.

Qualifications

Sec. 2. The qualifications for membership in the two classes are as follows:—

(a) Any person is eligible to active membership who is interested in the object for which the Association is organized.

(b) Any person who has rendered conspicuous service of a high order of merit to the dairy industry is eligible to election as an honorary member.

Election of Active Members

Sec. 3. Nominations for active membership shall be submitted to the Executive Committee in written form and signed by at least one member. After receiving the endorsement of a majority of the Executive Committee and paying the annual membership dues, the nominee shall be duly enrolled as a member of the Association.

Election of Honorary Members

Sec. 4. Nominations for honorary membership shall be submitted to the Executive Committee in written form and signed by at least five members. After receiving the unanimous endorsement of the Executive Committee and notifying the secretary of his acceptance the nominee shall be duly enrolled as an honorary member of the Association.

Article IV. Officers

Section 1. The officers of this Association shall be a president, a first vice president, a second vice president, a third vice president, and a secretary-treasurer. The term of office shall be for one year. The term of office shall begin March 1st.

Executive Committee

Sec. 2. The president, the first, second and third vice presidents and the secretary-treasurer of the Association shall constitute the Executive Committee.

Board of Directors

Sec. 3. The Executive Committee, the presiding officers of the Sections of the Association, and the president of the State dairy organizations in Pennsylvania, who shall be members of the Association ex-officio, shall constitute the Board of Directors.

Duties

Sec. 4. (a) The duties of the officers shall be those usually pertaining to their respective offices.

(b) The Executive Committee shall pass upon all nominations for membership and all applications for the organization of sections of the Association. It shall have the power to fix the time and place for the annual meeting and shall be authorized to transact such business of the Association as demands attention while the Association is not in session.

(c) It shall be the duty of the Board of Directors to give careful thought to problems of importance involving the welfare of the Dairy Industry, to bring to the attention of the Association matters that should have its consideration and to meet on questions of importance at times when it is not feasible to call a general meeting. A majority of the Board of Directors shall constitute a quorum.

How Elected

Sec. 5. At the Annual Meeting the president shall appoint a Committee on Nominations which shall suggest the names of one or more members for each office to be filled. Additional nominations may be made from the floor. Vote shall be by ballot. The candidates receiving the most votes shall be declared elected.

Vacancies

Sec. 6. A vacancy in the Executive Committee of the Association shall be filled by appointment by the Board of Directors for the remainder of the term of office.

Article V. Sections

Section 1. Groups based upon specialized interests to be known as Sections of the Association and to be formed by not less than ten active members may be authorized by the Executive Committee when considered for the best interests of the Association.

Such Sections may elect their own officers and may make any rules for their own guidance not inconsistent with hte interests of the Association as a whole, or with the constitution and by-laws of the Association.

Article VI. Amendments

Section 1. The constitution may be amended by a two-thirds vote at any regular meeting of the Association; provided the proposed amendments have been submitted to the Executive Committee in writing not less than thirty days previous to the meeting at which the vote is taken; and provided the proposed amendment is approved by a majority of the Executive Committee.

BY-LAWS

Dues

Section 1. The active membership dues shall be $1.00 a year, payable March 1st, each year. No dues are required of Honorary Members.

Arrears

Sec 2. Arrears for dues for two years shall thereby cancel membership, but the member may be restored to good standing without any action of the Association by payment of all arrears including dues for the current year.

Association Meetings

Sec. 3. The time and place of all meetings of the Association shall be fixed by the Executive Committee.

Quorum

Sec. 4. A quorum at any general meeting of the Association for the transaction of business shall consist of not less than ten per cent. of the active members.

Section Meetings

Sec. 5. The time and place of the general meeting for the Sections of the Association shall be fixed by the Executive Committee. All other arrangements regarding the Section meetings shall be made by the officers of the Section.

State Dairy Organization Defined

Sec. 6. A State Dairy Organization is one that is state wide in its nature, such as the Pennsylvania Federation of Holstein-Friesian Clubs, the Pennsylvania Ayrshire Breeders' Association, the Pennsylvania Jersey Cattle Club, the Pennsylvania Ice Cream Makers' Association, the Pennsylvania Cow Testers' Association, the Pennsylvania Association of Dairy and Milk Inspectors, the Inter-State Milk Producers' Association, the Dairymen's Cooperative Sales Company, the Dairymen's League, or others on a similar basis of organization.

Amendment

Sec. 7. These by-laws may be amended at any regularly called meeting by a two-thirds vote of those present.

The Constitution and By Laws, as presented above were unaminously adopted by the association.

MEMBERS OF THE PENNSYLVANIA DAIRYMEN'S ASSOCIATION

Acker, T. R., Mifflintown, Pa.
Adams, Charles F., Waynesburg, Pa.
Adams, J. H., Waynesburg, Pa., Box 83, R. D. 5.
Allinson, E. P., West Chester, Pa.
Arnold, J. R., Hellam, Pa.
Allebach, H. D., Trappe, Pa.

Baily, W. A., Dimock, Pa.
Balderston, R. W., Inter-State Milk Prod. Assn., Phila.
Bamford, J. D., Midway, Pa.
Barnes, F. M., 39th and Woodward Aves., Phila.
Beaver, Thomas, Bellfonte, Pa.
Bechdel, S. I., Extension Dept., State College, Pa.
Bechter, E. P., Royersford, Pa.
Bell, John A., Jr., Coraopolis, Pa.
Bennetch, J. H., Sheridan, Pa.
Bernheisel, H. M., Green Park, Pa.
Bernheisel, J. L., Loysville, Pa.
Berryhill, G. M., Hickory, Pa.
Bishop, W. S., Doylestown, Pa.
Black, J. R., Millerstown, Pa.
Borland, A. A., 58 Dairy Bldg., State College
Brackman, John, Troy, Pa.
Braum, R. A., Morganza, Pa.
Briesch, R. J., Catawissa, Pa., RFD 2
Brinton, J. H., Gap, Pa.
Brinton, R. F., West Chester, Pa.
Bronson, J. W., New Galilee, Pa.
Brownell, S. J., Extension Dept., State College
Brundage, David W., Farm Bureau, Bedford
Brungart, H. N., Smullton, Pa.
Bryan, James, P. O. Box 501, Waynesburg, Pa.
Bryan, John K., N. Richill St., Waynesburg
Buck, Lawrece C., Ulysses, Pa.
Burlington County Supply and Produce Co., Mt. Holly, N. J.
Bushong, Benj., Columbia, Pa., R. F. D. 2
Bushong, N. M., Columbia, Pa.

Campbell, J. S., Jr., Butler, Pa.
Campbell Murle, Wellsboro, Pa.
Canby, Joseph O., Hulmeville, Pa.
Carey, Corey C., Sewickley, Pa.
Chaffee, M. S. and F. M., Ulster, Pa.
Chamberlain, Carl, Farm Bureau, Williamsport
Clark, George, Jr., Shamokin, Pa.
Clark, H. S., Court House, Huntington, Pa.
Cobb, H. N., Towanda, Pa.
Cole, Fred L., Box 72, Lewisburg, Pa.
Coolidge, L. E., Wellsboro, Pa.
Coutler, Leo J., County Agent, Mauch Chunk, Pa.
Cowan, Charles, New Holland, Pa.
Cowden, W. Lee, McDonald, Pa.

Cox, P. J., Warriorsmark, Pa.
Craig, Albert N., Sewickley, Pa.
Craig, H. C., Curllsville, Pa.
Crissey, Allen N., Salem, N. J.

Dahle, C. D., Extension Dept., State College, Pa.
Dairy Farmer, Waterloo, Iowa
Deebel, Elmer, Ringtown, Pa., R. D.
Delaware County Home, Lima, Pa.
Deubler, E. C., Ithan, Pa.
Deubler, E. S., Narberth, Pa.
Devine, Robert F., Gospel Farm, Wesleyville, Pa.
Dickinson, Dr. B. M., Coraopolis, Pa.
Drumheller, Wallace, Lehighton, Pa.
Doan, E. J., Extension Dept., State College, Pa.
Duncan, H. B., Farm Bureau Office, Clearfield, Pa.

Ealy F. R., New Holland, Pa.
Ehrnsburger, Rouse Hospital, Warren, Pa.
Ely, George W., 7105 Franstown Ave., Pittsburgh, Pa.
Erdman, A. H., Elizabethville, Pa.

Fagan, C. P., 125 E. Kennedy, North Side, Pittsburgh, Pa.
Faust, A. G., Winber, Pa.
Fergus, Hugh, Slippery Rock, Pa.
Fetterman, J. Gordon, Media, Pa., R. 1
Fidler, A. J., Rock, Pa.
Fitts, E. B., 58 Dairy Bldg., State College, Pa.
Folwell, Mrs. Mary, Bowman Ave., Merion, Pa.
Forster, Wm. H., 323 W. 6th Street, Erie, Pa.
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